DOCUMENT RESUME

ED 319 385 IR 014 404

AUTHOR Isonio, Steven; And Others
TITLE Microcomputers in Instruction, 1984-85 through 1987-88. Publication No. 538.
INSTITUTION Los Angeles Unified School District, CA. Program Evaluation and Assessment Branch.
PUB DATE Nov 89
NOTE 139p.; For 1984-85 through 1986-87, see ED 304 098.
PUB TYPE Reports - Research/Technical (143) -- Statistical Data (110)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Adult Education; *Computer Assisted Instruction; Elementary Secondary Education; *Longitudinal Studies; Magnet Schools; *Microcomputers; School Surveys; Special Education; *Use Studies

ABSTRACT

In October of the years 1984 through 1987, as part of the Annual School Program Survey, and primarily at the request of the Office of Instruction of the Los Angeles Unified School District (LAUSD), all elementary, secondary, and adult school principals were asked to provide information concerning computer usage at their schools. Results of the study indicate a significant increase in the number of microcomputers in the LAUSD, a trend which was reflected across all districts and at all levels. This produced a drop in the student per microcomputer ratio. However, because the extent to which individual computers are actually used varies, and because some units are used for office and administrative purposes, this finding should be interpreted with some care. Nevertheless, the variety of ways in which the computers are used also increased significantly. In particular, there appears to be a shift toward supplementing traditional applications such as computer programming and mathematics with uses that reinforce subject areas such as reading and language arts. Data on computers in the schools and computer applications are presented in 13 graphs and 64 tables, which are grouped by educational level and region. (2 references) (GL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Floraline Stevens

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

MICROCOMPUTERS IN INSTRUCTION,

1984-85 THROUGH 1987-88

Publication No. 538

This Report Was Prepared By

Steven Isonio, PhD
Dan Pike, PhD
Leo Weisbender, PhD
Deborah Oliver, PhD

Program Evaluation and Assessment Branch
Los Angeles Unified School District

November 1989

Los Angeles Unified School District

LEONARD M. BRITTON
Superintendent

APPROVED:

FLORALINE I. STEVENS, Director
Program Evaluation and Assessment Branch

Table of Contents

	Page
List of Tables in Appendix A	iv
List of Tables in Appendix B	vi
List of Figures	viii
Executive Summary	ix
Introduction	1
Method	2
Results	4
Computer Usage	4
Supply of Equipment	10
Types of Microcomputers	12
Ways in Which the Computers Are Used	19
Summary and Recommendations	26
References	28
Appendix A	29
Appendix B	62

List of Tables in Appendix A: Computers in the Schools

Table		Page
A-1	Computers in the Schools: All Schools	30
A-2	Computers in the Schools: All Elementary	31
A-3	Computers in the Schools: All Junior High	32
A-4	Computers in the Schools: All Senior High	33
A-5	Computers in the Schools: Magnets/Other, All Grade Levels	34
A-6	Computers in the Schools: Elementary, Region A	35
A-7	Computers in the Schools: Elementary, Region B	36
A-8	Computers in the Schools: Elementary, Region C	37
A-9	Computers in the Schools: Elementary, Region D	38
A-10	Computers in the Schools: Elementary, Region E	39
A-11	Computers in the Schools: Elementary, Region F	40
A-12	Computers in the Schools: Elementary, Region G	41
A-13	Computers in the Schools: Elementary, Region H	42
A-14	Computers in the Schools: Junior High, Region A	43
A-15	Computers in the Schools: Junior High, Region B	44
A-16	Computers in the Schools: Junior High, Region C	45
A-17	Computers in the Schools: Junior High, Region D	46
A-18	Computers in the Schools: Junior High, Region E	47
A-19	Computers in the Schools: Junior High, Region F	48
A-20	Computers in the Schools: Junior High, Region G	49
A-21	Computers in the Schools: Junior High, Region H	50
A-22	Computers in the Schools: Elementary and Junior High Magnets, Region A	51

Table Page

A-23 Computers in the Schools: Elementary and Junior High Magnets, Region B 52

A-24 Computers in the Schools: Elementary and Junior High, Region C 53

A-25 Computers in the Schools: Elementary and Junior High Magnets, Region D 54

A-26 Computers in the Schools: Elementary and Junior High Magnets, Region E 55

A-27 Computers in the Schools: Elementary and Junior High Magnets, Region F 56

A-28 Computers in the Schools: Elementary and Junior High Magnets, Region G 57

A-29 Computers in the Schools: Elementary and Junior High Magnets, Region H 58

A-30 Computers in the Schools: Senior High Division Magnets/Other 59

A-31 Computers in the Schools: Special Education 60

A-32 Computers in the Schools: Adult and Occupational Education 61

List of Tables in Appendix B: Computer Applications in the Schools

Table		Page
B-1	Computer Applications in the Schools: All Schools	63
B-2	Computer Applications in the Schools: All Elementary	64
B-3	Computer Applications in the Schools: All Junior High	65
B-4	Computer Applications in the Schools: All Senior High	66
B-5	Computer Applications in the Schools: Magnets/Other, All Grade Levels	67
B-6	Computer Applications in the Schools: Elementary, Region A	68
B-7	Computer Applications in the Schools: Elementary, Region B	69
B-8	Computer Applications in the Schools: Elementary, Region C	70
B-9	Computer Applications in the Schools: Elementary, Region D	71
B-10	Computer Applications in the Schools: Elementary, Region E	72
B-11	Computer Applications in the Schools: Elementary, Region F	73
B-12	Computer Applications in the Schools: Elementary, Region G	74
B-13	Computer Applications in the Schools: Elementary, Region H	75
B-14	Computer Applications in the Schools: Junior High, Region A	76
B-15	Computer Applications in the Schools: Junior High, Region B	77
B-16	Computer Applications in the Schools: Junior High, Region C	78
B-17	Computer Applications in the Schools: Junior High, Region D	79

Table Page

B-18 Computer Applications in the Schools: Junior High, Region E 80

B-19 Computer Applications in the Schools: Junior High, Region F 81

B-20 Computer Applications in the Schools: Junior High, Region G 82

B-21 Computer Applications in the Schools: Junior High, Region H 83

B-22 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region A 84

B-23 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region B 85

B-24 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region C 86

B-25 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region D 87

B-26 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region E 88

B-27 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region F 89

B-28 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region G 90

B-29 Computer Applications in the Schools: Magnets (Elementary and Junior High), Region H 91

B-30 Computer Applications in the Schools: Magnets/Other, Senior High Division 92

B-31 Computer Applications in the Schools: Special Education . . . 93

B-32 Computer Applications in the Schools: Adult and Occupational Education 94

List of Figures

Figure		Page
1	Number of Microcomputer and Computer Terminal Users, All Schools, 1984-87	6
2	Percentage of Enrolled Students Who Use Microcomputers, 1984-87	9
3	Number of Users per Microcomputer, by Level and Year, 1984-87	11
4	Types of Computers Used (As Proportion of Total), All Schools, 1984-87	14
5	Types of Computers Used in Elementary Schools (As Proportion of Total), 1984-87	15
6	Types of Computers Used in Junior High Schools (As Proportion of Total), 1984-87	16
7	Types of Computers Used in Senior High Schools (As proportion of Total), 1984-87	17
8	Types of Computers Used in Magnets/Other Schools (As Proportion of Total), 1984-87	18
9	Percentage of All Schools Reporting Selected Computer Uses, 1984-87	20
10	Percentage of Elementary Schools Reporting Selected Computer Uses, 1984-87	21
11	Percentage of Junior High Schools Reporting Selected Computer Uses, 1984-87	23
12	Percentage of Senior High Schools Reporting Selected Computer Uses, 1984-87	24
13	Percentage of Magnets/Other Schools Reporting Selected Computer Uses, 1984-87	25

Executive Summary

Background

In October of the years 1984 through 1987, as part of the Annual School Program Survey, and primarily at the request of the Office of Instruction, all elementary, secondary, and adult school principals were asked to provide information concerning computer usage at their schools. The present report is the fourth in a series of annual reports intended to document the growth in computer usage in the LAUSD.

Method

Responses to computer related questions on the Annual School Program Survey constitute the data upon which this report is based. In addition to summarizing the most recent data, the present report makes longitudinal comparisons across the 4-year span.

Major Findings

- The number of students using microcomputers was 96,840 in 1984, while 16,385 used computer terminals in that year.
- In 1987, 214,367 users were reported for a microcomputer/ terminal user category.
- During 1984-87, a 370% increase occurred in the number of microcomputers available in the schools.
- An average of 26 students used each microcomputer unit in 1984; this ratio dropped to 12 users per unit in 1987.
- The vast majority of microcomputers acquired between 1984 and 1987 were Apple computers; their proportion rose from 38% to 79% in that period.

- The specific computer uses reported by the highest percentages of all schools combined were those in the Computer Education Foundation Program (75%), followed by applications in mathematics (69%), reading (59%), and language arts (58%).
- Over the 4-year span, the largest increase in area of computer use, at all levels, was in administrative/office applications. Other applications showing marked increases were reading and language arts.

Conclusions

In the 4-year period examined, there was a phenomenal increase in the number of microcomputers in the LAUSD, a trend which was reflected across all regions/districts and at all levels. This produced a drop in the student per microcomputer ratio. However, because the extent to which individual computers are actually used varies, and because some units are used for office and administrative purposes, this finding should be interpreted with some care. Nevertheless, the variety of ways which the computers are used also increased significantly. In particular, there appears to be a shift toward supplementing traditional applications such as computer programming and math with uses that reinforce subject areas such as reading and language arts.

Recommendations

The findings in this report raise a number of questions that go beyond the scope of the data supplied by the Annual School Program Survey for the present study, and that need to be addressed by new research.

One set of such questions relates to the acquisition of new equipment and the implementation of software applications. It includes: How is equipment and software selected? Are hardware and software accessible to all students? To what extent (e.g., number of hours per week) are the computers being used in various settings?

A second set of questions pertains to the effectiveness of computers in education. This set includes: How do students and teachers feel about computers? Is there evidence that instruction with the aid of a computer is better than without? What is the best way to incorporate computers into the curriculum? Carefully designed research addressing these questions could help shape policies for the acquisition and use of computer equipment and software.

Since the effectiveness of computers as instruction tools likely varies across applications, as well as with the nature and context of specific programs, future research should focus on elements of individual computer applications and contextual factors, which interact to determine effectiveness of computers as instruction tools in particular settings. As an example, a study is currently being planned to evaluate the effectiveness of computer-assisted instruction in high school algebra courses, and to address how computers can best be integrated with other instructional delivery systems.

Introduction

Computers are a major part of our present technology and are certain to be an even greater part of our future technology. It is important that children be able to function in our computer-oriented society. They need to know how to use computers, as well as to understand how computers work and the impact computers have on society. Not only should students learn about computers, per se, but that computers can be used as tools for teaching a wide range of other subjects.

As microcomputers have become smaller and less expensive, their use in classrooms has grown. They are not designed to replace teachers, but rather to enhance instruction. Computer Assisted Instruction (CAI) can take many forms (e.g., practice drills, tutorials, simulations, and problem solving), and can be used as a part of the instruction of most subjects. Their range of uses is limited only by the imagination of the teachers and the programmers. They can also help the teacher with recordkeeping, test preparation, and as an audiovisual aid to illustrate ideas.

Research regarding computer use in education has been extensive. Kulik and Kulik (1987) conducted a meta-analysis of 199 studies which addressed this topic. They found that students using computers as part of their education learned more in less time, scored higher on tests, and liked classes more than did their counterparts exposed to conventional teaching methods only. However, Kulik and Kulik indicated that computers are not helpful to everyone. They also noted that caution should be exercised in interpreting their findings since the

sample of studies may not represent all studies conducted, because some editors may have a bias against publishing studies with negative results.

An article by Lawton and Gerschner (1982) reported on a review of students' attitudes regarding computers. They found that students have somewhat positive attitudes toward computers, with many students mentioning that computers have infinite patience, don't get tired or frustrated or angry, never forget to praise, give immediate feedback, and are more objective than their teachers. Factors such as computer language, software, implementation, and "computer phobia" influenced student attitudes, as well.

While there has been much research regarding the use of computers in education in general, there is a need to document the extent and variety of ways which computers are used in the Los Angeles Unified School District, in particular. This report is a preliminary examination of the status of microcomputer use in the LAUSD. It concentrates on the number and types of computers in the schools, and documents the ways these computers are being used. The data upon which the report is based were collected as part of the Annual School Program Survey over the 4-year period, 1984-87. Suggestions for further study are also presented.

Method

The LAUSD Annual School Program Survey was distributed to principals in the fall of years 1984, 1985, 1986, and 1987. Principals at the K-12 sites received Form 3, and those at adult schools received Form 5. As part of the survey, principals were asked about the use of

computers at their schools. They were to indicate the number of students using computers, the types of computers being used, and the number of rooms designated for computer purposes. They also were asked to estimate the number of microcomputers they expected to either buy or receive during that school year. In addition, principals were to report on the various ways the equipment is used in the schools.

It should be noted that certain aspects of the survey forms differed slightly from year to year. For example, data were not collected about the Computer Education Foundation Program (CEFP) in 1984, but this category of use appeared on the 1985 through 1987 survey forms. Another change for fall 1987 is that principals were asked to "enter the number of students who use computers/terminals," rather than to report these figures separately as in earlier years. Thus, for example, a small number of the reported 214,367 users in 1987 were actually using computer terminals rather than microcomputers. As such, this number slightly overstates the amount of microcomputer users in that year. These changes, while involving only relatively minor aspects of the survey, should be kept in mind when examining the findings reported below, because they may have affected the results, however slightly.

Data for type and level of school categories were tabulated in the following aggregates: elementary schools, junior high schools, elementary and junior high magnets, senior high schools (excluding senior high magnets, opportunity and continuation schools/centers), magnets/other schools (senior high magnets, opportunity and continuation schools/centers), special education schools, and adult and occupational

education schools. The largest segment of students in this latter category were those students in the senior high magnets.

After the forms were returned and keypunched, computer programmers formatted a report using both Form 3 and Form 5 data. The tables which summarize the major findings for the present report were developed from that listing.

Results

Two general categories of information were collected: extent of computer usage (i.e., number of students using equipment, number of various types of computers used) and ways that computers are used (e.g., in which instructional subjects). Within these categories, data are organized by level as described above (elementary schools, junior high schools, elementary and junior high school magnets, senior high schools, senior high magnets/other schools, and for the entire district). Where appropriate, the data are further divided by region/division. Tables containing this information can be found in Appendices A and B.

Computer Usage

Enrollment for schools responding to the computer-related items on the Annual School Program Survey was broken down by level for 1984-87, and this information is presented in Table 1. This information provides a necessary frame of reference when analyzing variations in the numbers of student users at each level.

Districtwide, the number of students using microcomputers has risen markedly since 1984, as shown in Table A-1 (series A tables are in Appendix A) and Figure 1. Whereas there were 96,840 microcomputer users

Table 1

Enrollment for Schools Responding to Computer-Related Items, 1984-87

Schools	Fall 1984	Fall 1985	Fall 1986	Fall 1987
Total district	692,631	701,870	722,472	727,012
Elementary	295,014	305,578	314,640	316,832
Junior high	115,684	115,600	115,790	116,389
Senior high	121,186	124,658	125,413	121,325
Magnets/other[a]	160,747	156,034	166,629	172,466

[a]Includes elementary and junior high magnets, senior high magnets/other (senior high magnets, opportunity and continuation schools/centers), special education schools, and adult and occupational education schools.

RCUSAG1A,RLEO

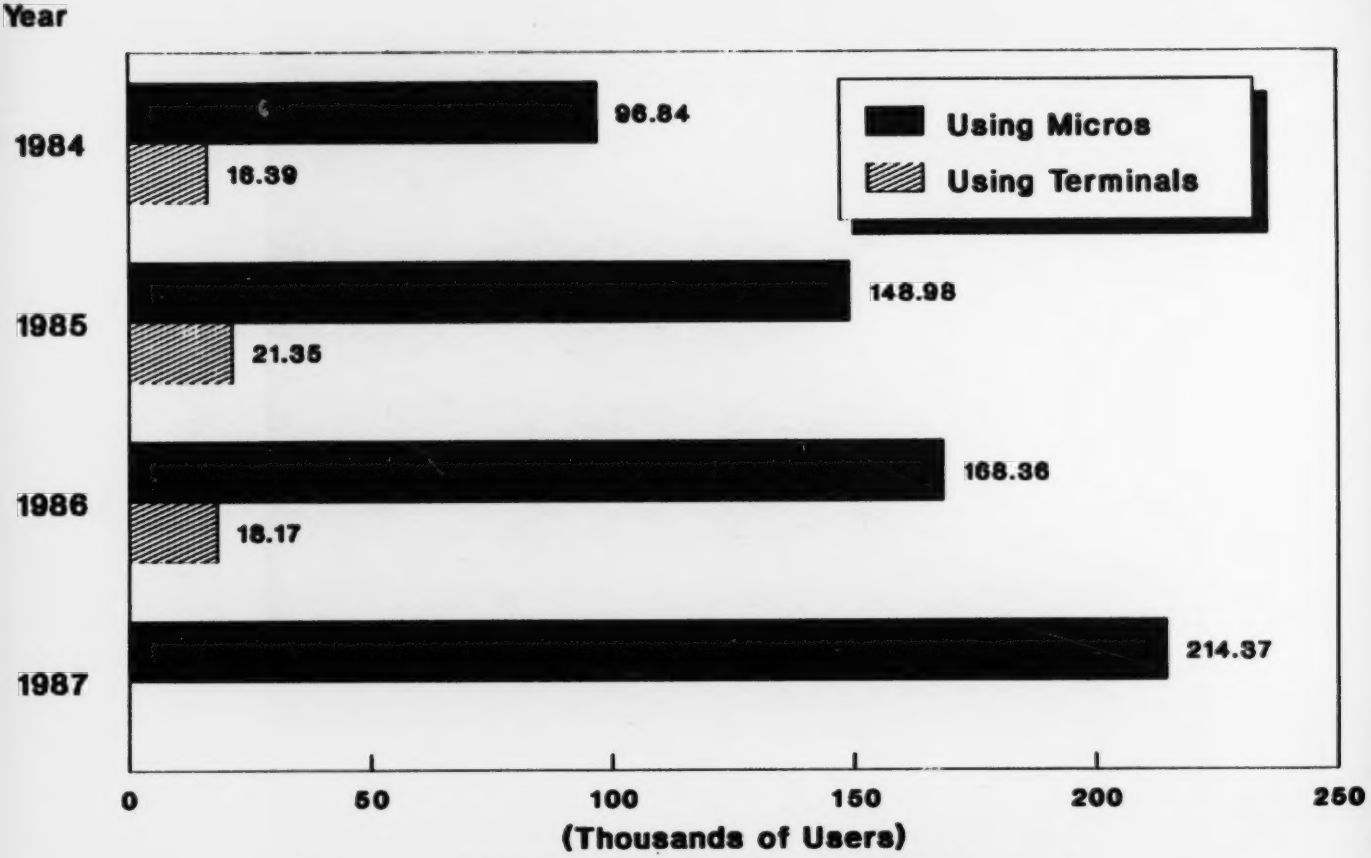

Figure 1. Number of microcomputer and terminal users, all schools, 1984–87.

in 1984, 214,367 users were tallied in the microcomputer/terminal user category in 1987. While this latter figure includes users of computer terminals, certainly the greatest proportion of these were users of microcomputers. In any case, the large increase in microcomputer users can be contrasted with the relatively slight change in the number of computer terminal users (from 16,385 in 1984 to 18,165 in 1986). Clearly, the use of microcomputers is being expanded at a high rate, whereas this certainly is not the case with computer terminal usage.

More detailed information about these trends can be obtained from examination of data for specific levels. Over the 4-year period, the number of elementary pupils using microcomputers at school rose from 55,947 to 129,026, representing a 130.62% increase (see Table A-2). While not as high as that for microcomputer usage, the rate of elementary pupil use of computer terminals did jump from 6,079 in 1984 to 10,320 in 1986 (a 69.76% rise). Tables A-6 through A-13 present this information by region.

In junior high schools, tallies of students using microcomputers climbed to 34,293 from 18,899 (an 81.45% rise) between 1984 and 1987. In contrast, the number of students using terminals actually dropped by 44.25% between 1984 and 1986 (Table A-3). Tables A-14 through A-21 present this information for junior high schools by region.

A very similar pattern was found in the senior high schools, and is shown in Table A-4. For these students, a 110.90% increase in microcomputer usage occurred (from 12,839 in 1984 to 27,077 in 1987). Computer terminal usage in senior high schools dropped from 3,626 in 1984 to 2,110 in 1986 (a decrease of 41.81%).

Microcomputer use by students in schools in the magnets/other category also showed dramatic growth. While 9,155 students in these schools were reported to have used microcomputers in 1984, 23,971 were doing so in 1987, representing a 161.84% jump (Table A-5). Although the number of computer terminal users at schools in this category is quite small relative to the number of microcomputer users, computer terminal usage did increase between 1984 and 1986 (from 1,091 to 2,619, a 140.06% jump). Tables A-22 through A-32 show information about microcomputer and computer terminal use by region/division.

While it is believable that at least part of the growth rates just described are attributable to enrollment increases at the schools, this is not the case. As Table 1 illustrates, in the 4-year period under investigation, enrollment at schools supplying data for this study climbed only 4.96%, an average of about 1.5% each year. Clearly, these relatively minor enrollment increases cannot account for the dramatic jumps in microcomputer usage observed. Further, it is unlikely that enrollment increases themselves could produce increases in computer usage because traditionally the factors limiting greater usage have been the relative unavailability of software and equipment, and trained teachers, rather than the number of available students. Nevertheless, the effects of enrollment changes can be controlled for by calculating the <u>percentage</u> of enrolled students who use microcomputers or computer terminals. Figure 2 shows the percentage of enrolled students who use microcomputers districtwide, as well as by level. Clearly, these percentages follow patterns essentially identical to those discussed above.

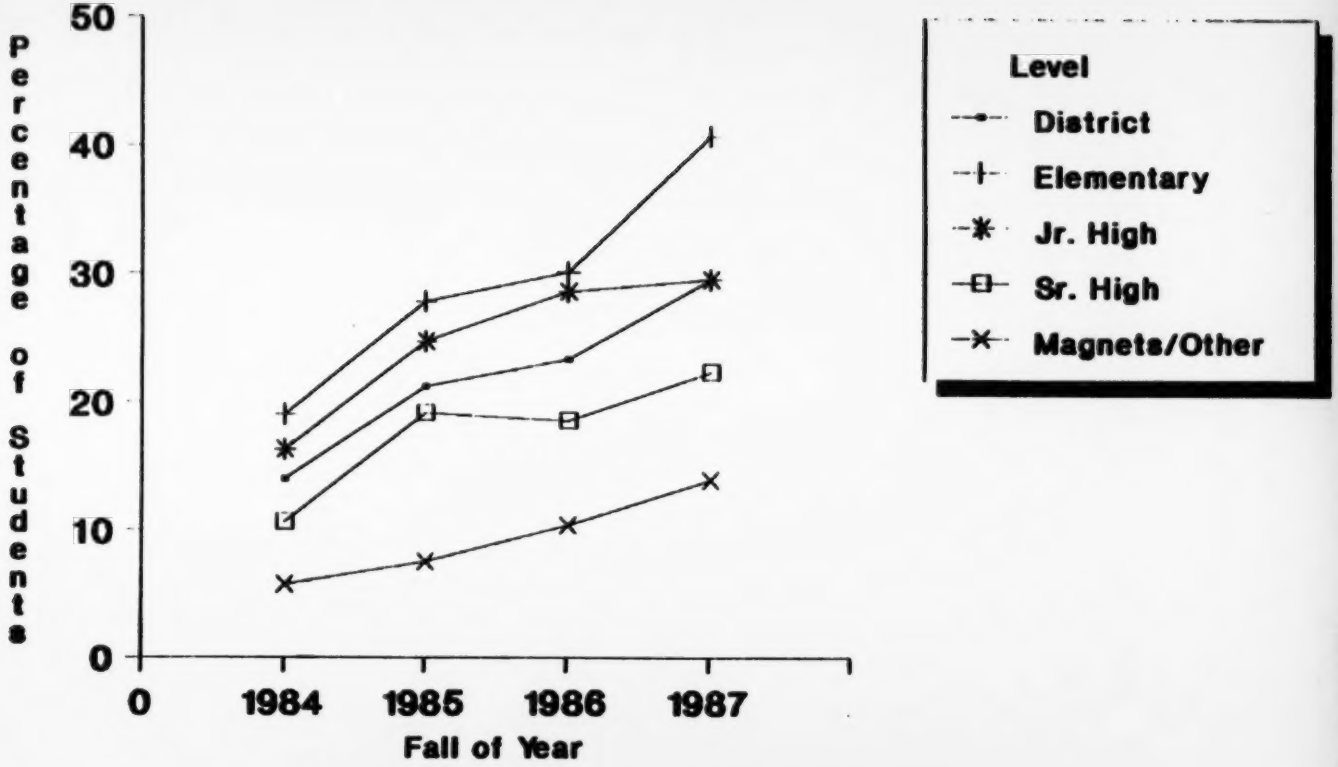

Figure 2. Percentage of enrolled students who use microcomputers, 1984-87.

Supply of Equipment

The overwhelming finding just outlined is that microcomputer use has increased at an incredible rate while terminal usage dropped slightly. There is a need to assess the extent to which the supply of microcomputers and computer terminals has changed to meet these changing usage demands.

As noted earlier, the district's commitment to meeting the increased demand for microcomputers is evident in that the number of microcomputers available at schools rose from 3,785 in 1984, to 17,801 in 1987 (a 370.30% increase). The rate at which the number of microcomputers increased exceeded the rate at which students who use this equipment increased, thus reducing the critical ratio of number of students per microcomputer. (This ratio was over 26 student users per microcomputer in 1984, but only 12 users per microcomputer in 1987.) The reduction of this ratio suggests that each student has a greater opportunity to work with computers, and further implies that students might be deriving greater benefit from them, a possibility which could be tested by additional research. Figure 3 shows the number of users per microcomputer, broken down by level and year for the entire district.

In the case of elementary schools, 4,855 more microcomputers were available in 1987 than in 1984 (a 424.39% increase). Despite the large increase in elementary school users noted above, the even greater increase in equipment availability brought the student users per microcomputer ratio down significantly from 49:1 in 1984, to 22:1 in 1987. Virtually the same availability is reported in junior high

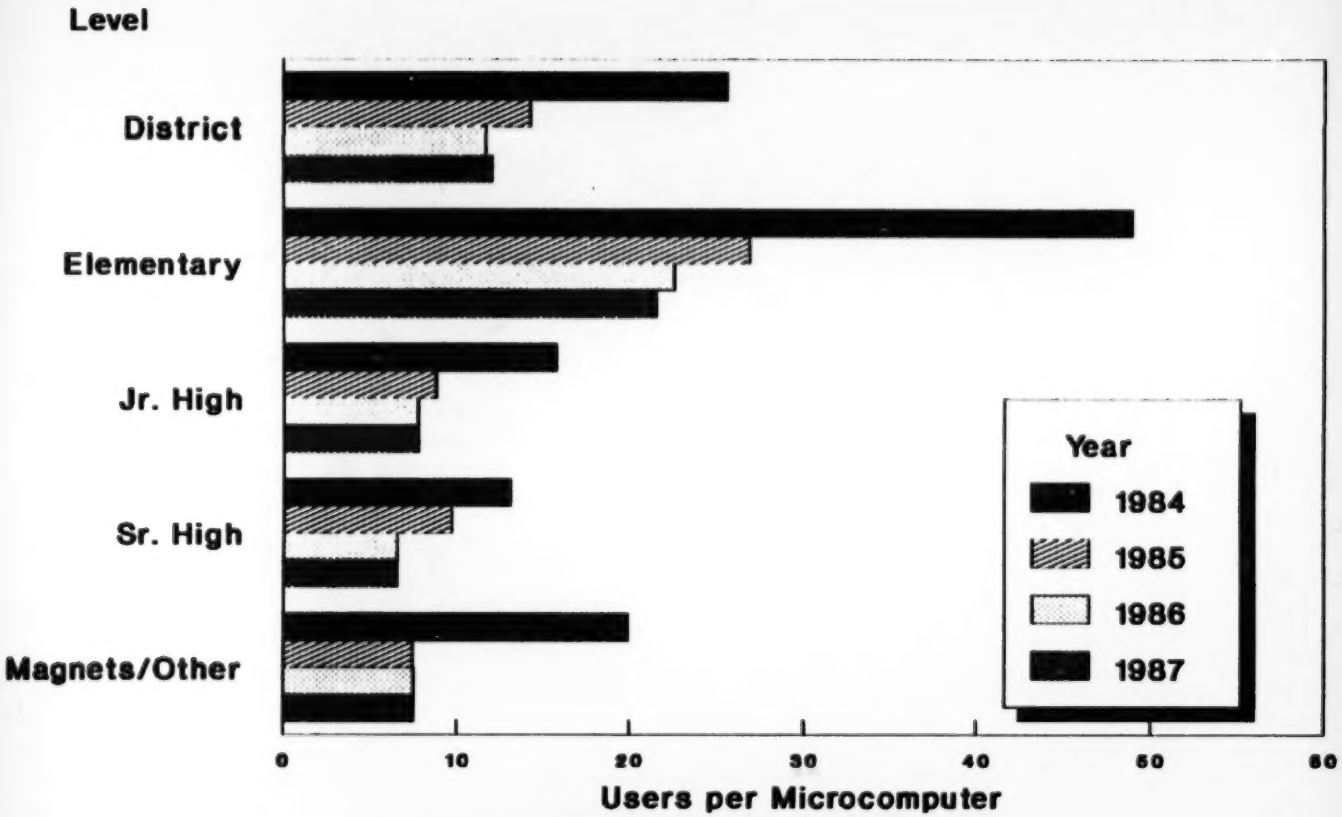

Figure 3. Number of users per microcomputer, by level and year, 1984-87.

schools. A total of 270.55% more microcomputers were present in junior high schools (up to 4,454 in 1987 from 1,202 in 1984). This resulted in a drop from an average of 16 users per machine in 1984 to only 8 per unit in 1987.

Microcomputers also became much more available in senior high schools (up to 4,153 in 1987 from 979 in 1984, this being a 324.21% increase). Not surprisingly, the student-to-microcomputer ratio also dropped in this period (from 13:1 in 1984, to 7:1 in 1987). In schools in the magnet/other category, 3,195 microcomputers were available in 1987, a rise of 594.57% from the 460 available in 1984. In these schools, the student-per-microcomputer ratio dropped from just under 20:1 in 1984 to about 7:1 in 1987.

Types of Microcomputers

A wide variety of types of microcomputers are used in the schools, but these types are far from equally represented. As Table A-1 reveals, districtwide in 1984, 1,427 (38%) of the microcomputers in the district were Apple, 1,273 (34%) were TRS-80, and 100 (3%) were IBM. The remaining computers (985, constituting 26% of the total) were an assortment of Ataris, Commodore Pets/Vics, and others. The vast majority of microcomputer acquisitions between 1984 and 1987 were Apple computers. Although in the few years immediately preceding the 4-year period under examination the district received a substantial number of Apple microcomputers as gifts, the Apple computer acquisitions described here were purchased by the district. Apple accounted for 79% (14,076) of the microcomputers in the schools in 1987. While the number of

TRS-80 computers did not change significantly in the 4-year span (up only 164, to a total of 1,437 in 1987), their proportion district-wide plummeted to 8% in that year. An appreciable increase in the number of IBM microcomputers occurred between 1984 and 1987 (from 100 to 976); even so, IBM machines accounted for only 5% of microcomputers in LAUSD in 1987. Figure 4 depicts the relative proportions of major types of microcomputers for each year from 1984 to 1987.

The huge increase in number of Apple computers described earlier is reflected at all levels (Table A-2). In 1984, 698 such machines (representing 61%) were in use in the elementary schools, whereas they totaled 5,323 in 1987 (89% of the total number in use at such schools). Other types of microcomputers exhibited only minor growth in elementary schools between 1984 and 1987, but in light of the huge jump in Apple computers, their associated proportions dropped significantly (Figure 5). In junior high schools, the proportion of Apple microcomputers rose from 20% (237) in 1984 to 78% (3,488) in 1987 (Table A-3). Of course, concomitant decreases in the proportions of other computer types also occurred (Figure 6).

In senior high schools, Apples accounted for 34% (335) of microcomputers in 1984 but 76% (3,152) in 1987 (Table A-4 and Figure 7). This same trend held for schools in the magnet/other category, as well. Specifically, 35% (157) of microcomputers in these schools were Apples in 1984, whereas this figure rose to 66% (2,113) in 1987 (Table A-5 and Figure 8). Again, given this huge increase, the relative amount of other types of microcomputers in magnets/other schools dropped significantly.

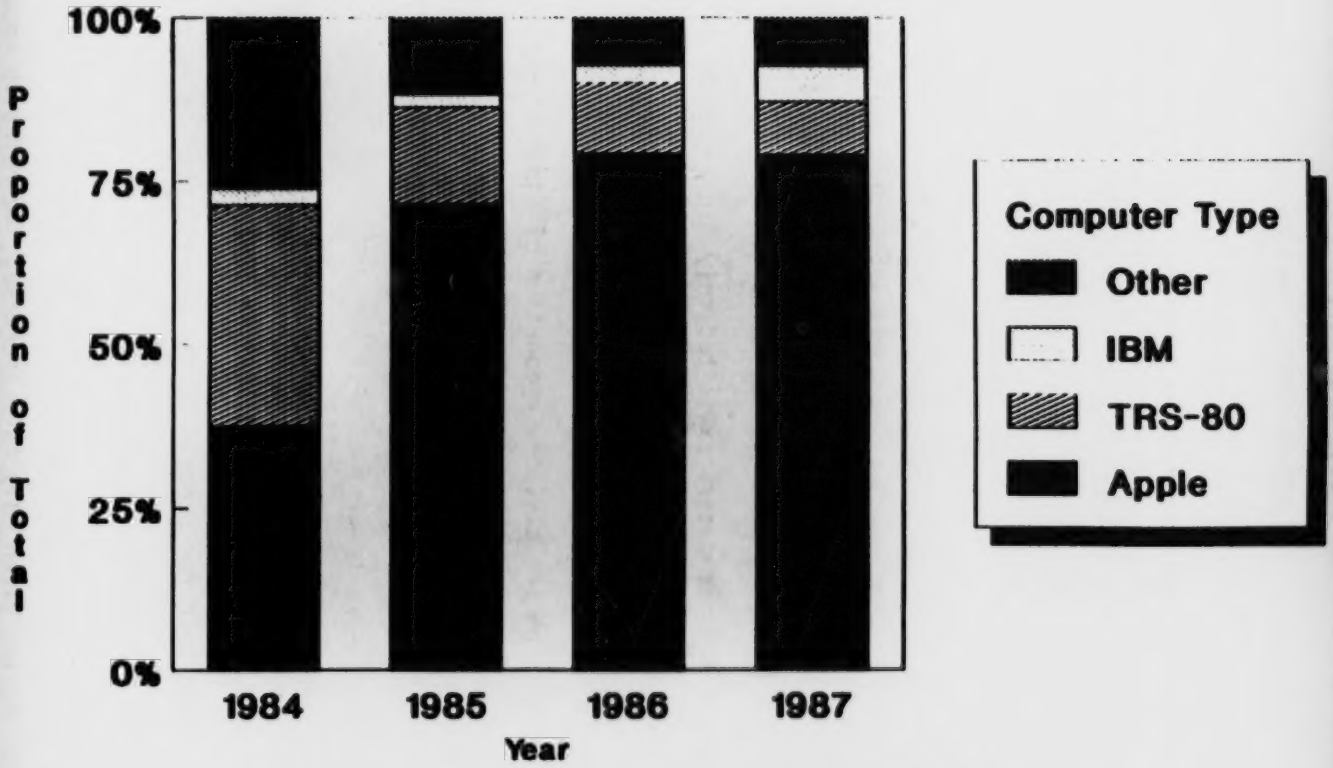

Figure 4. Types of computers used (as proportion of total), all schools, 1984-87.

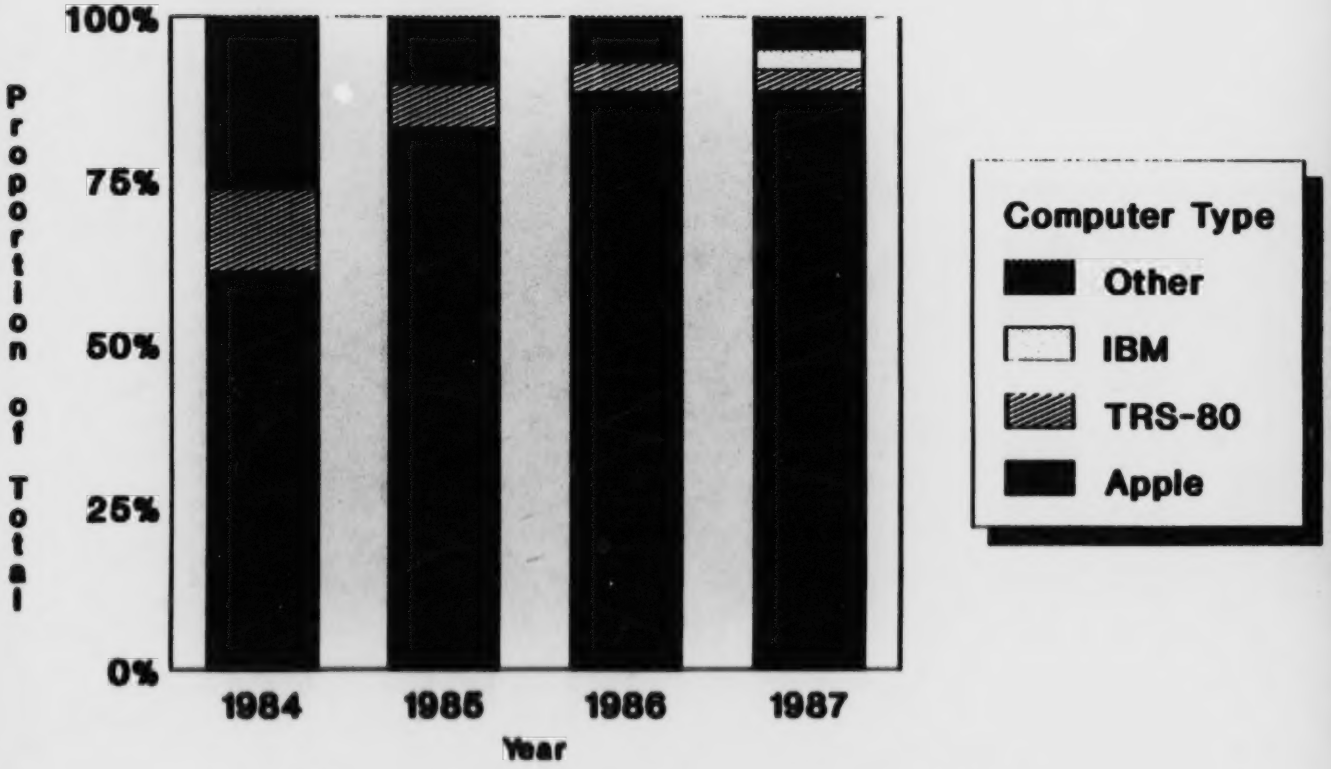

Figure 5. Types of computers used in elementary schools (as proportion of total), 1984-1987.

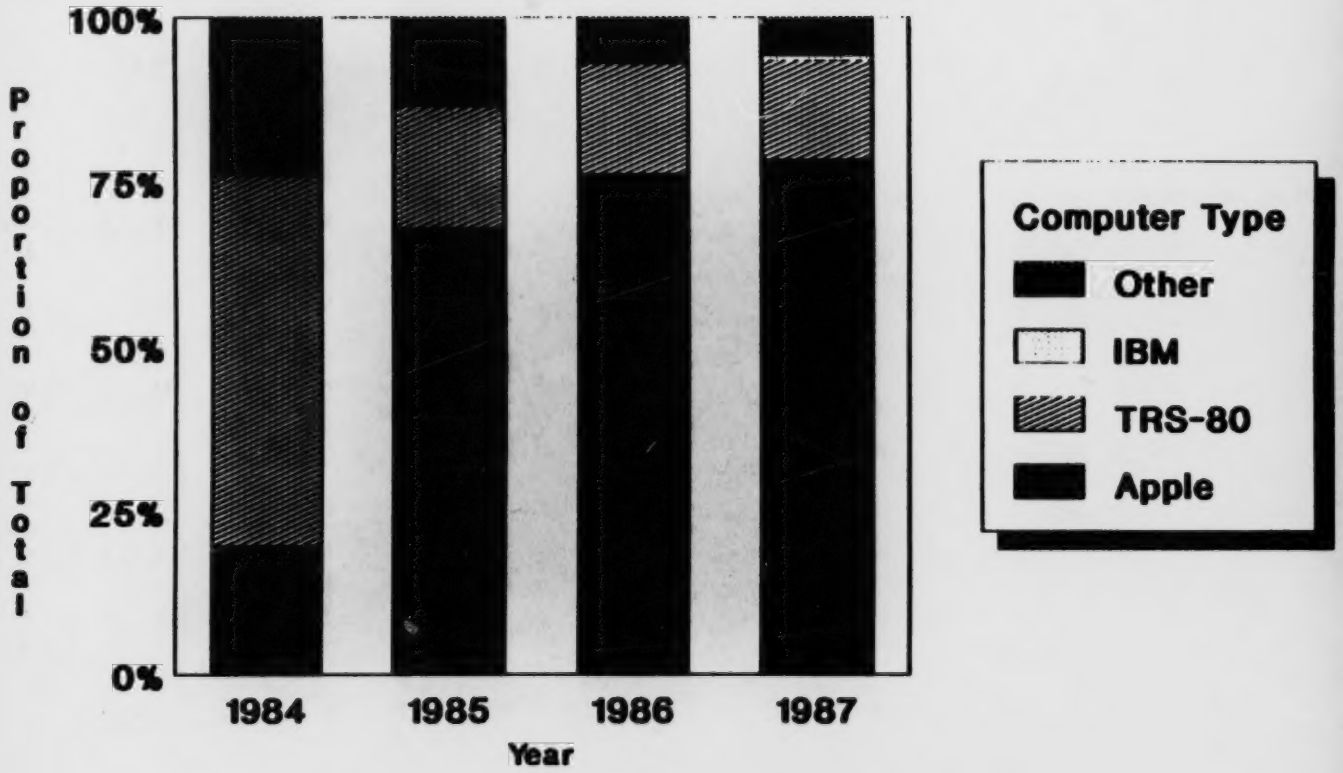

Figure 6. Types of computers used in junior high Schools (As Proportion of total), 1984-87.

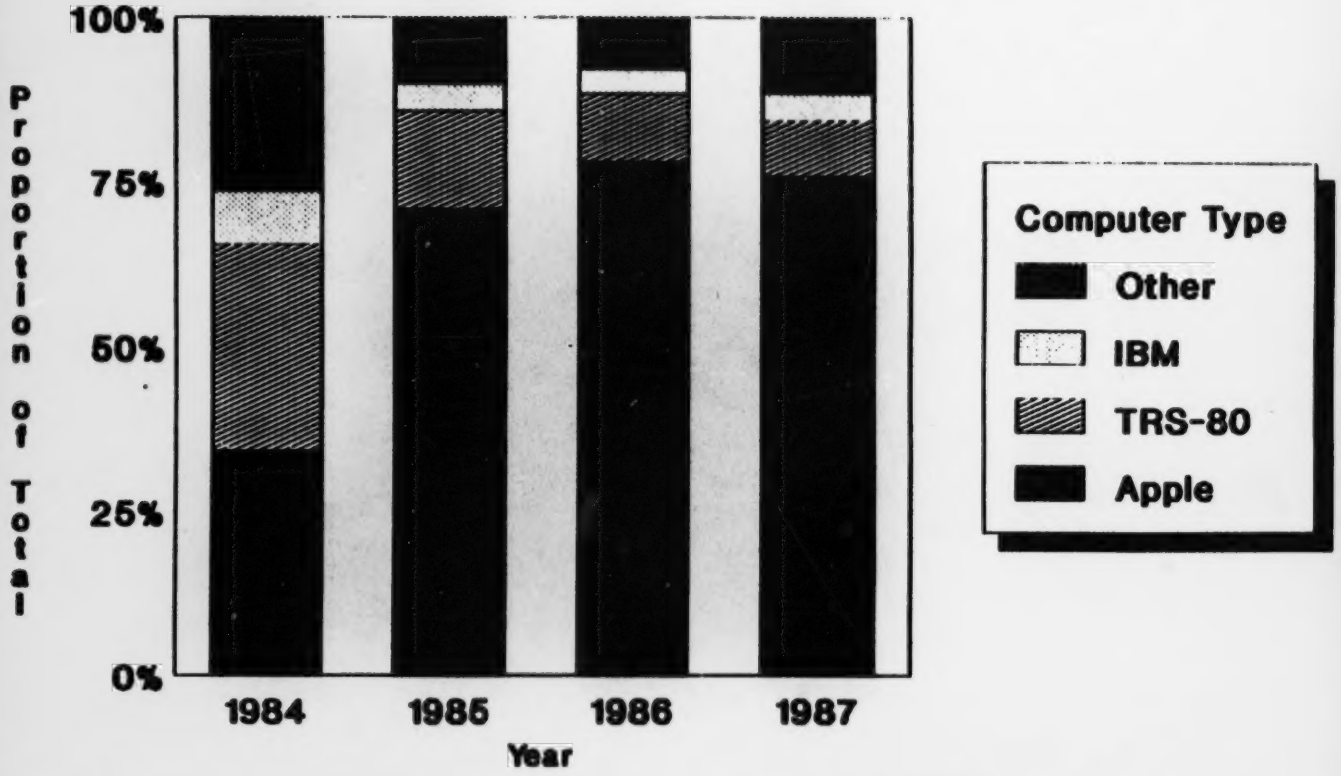

Figure 7. Types of computers used in senior high Schools (As Proportion of total), 1984-87.

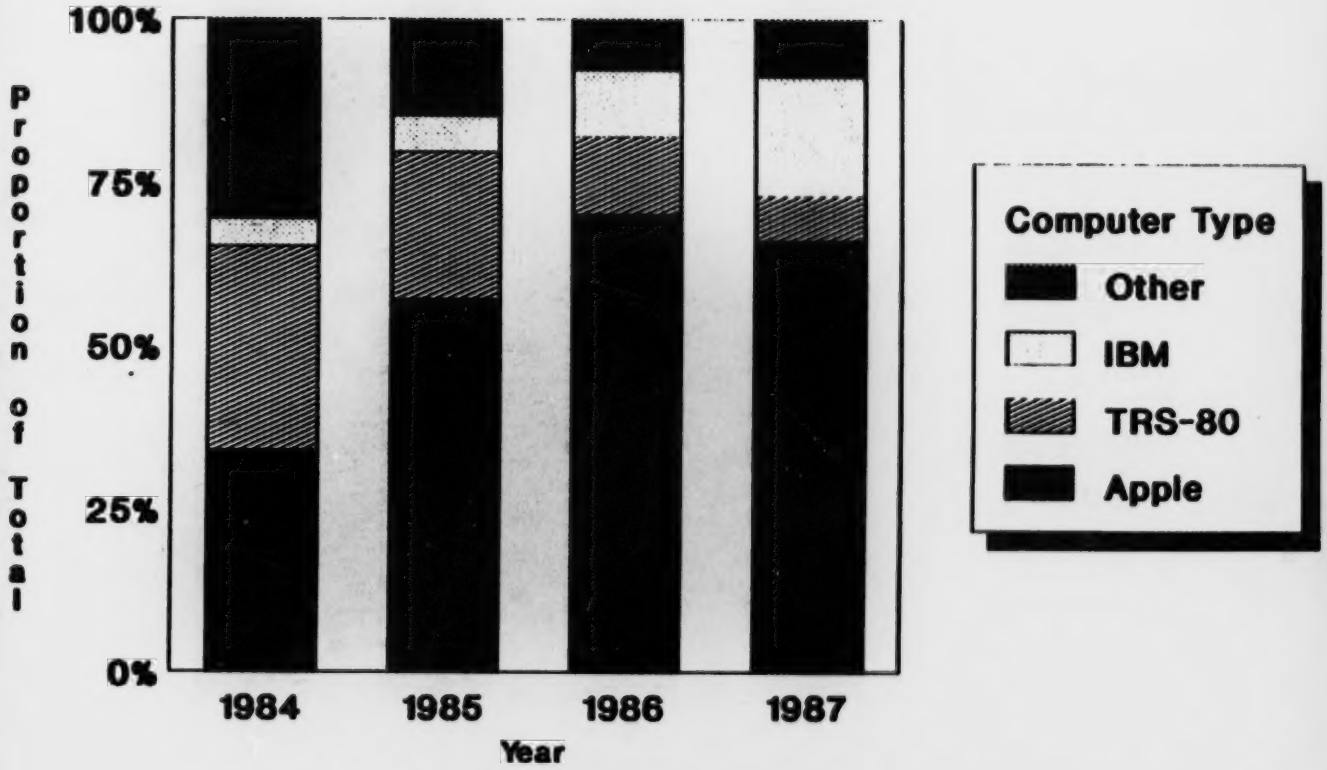

Figure 8. Types of computers used in magnets/other schools (as proportion of total), 1984-87.

Ways in Which the Computers Are Used

The annual fall survey asked principals merely to indicate which applications are taking place at their schools. No information was obtained regarding who was using the computers in the various ways, nor the extent of such use. Stated differently, the level of analysis for results discussed in the remainder of the paper is that of school units, not individual students, pieces of equipment, or amount of time.

The specific computer use reported by the highest percentage of schools districtwide in 1987 is the Computer Education Foundation Program (CEFP) (75%), followed by mathematics (68.7%), reading (59.3%), and language arts (58.4%). In 1984, when data were not collected for the CEFP category, mathematics (55.1%) was the predominant use, followed by computer programming (38.3%), and reading (37.6%). This information is presented in Table B-1 (series B tables appear in Appendix B) and is depicted graphically in Figure 9.

In elementary schools, over the 4-year span, the largest increase in reported computer use was for administrative/office purposes (occurring in 10.0% of schools in 1984, but 40.9% of schools in 1987), followed by language arts which rose from 45.6% to 75.1%. The smallest increase was for computer programming (32.7% of schools in 1984 to only 40.7% in 1987). This information appears in Table B-2 and Figure 10.

The computer use that served the largest increase at the junior high school level also served administrative purposes (from 27.4% of schools in 1984, to 61.6% in 1987), followed by reading (from 27.4% of schools in 1984, to 54.8% in 1987) and social science (from 13.7% to 37.0% of schools in the same time period). These trends are reported in

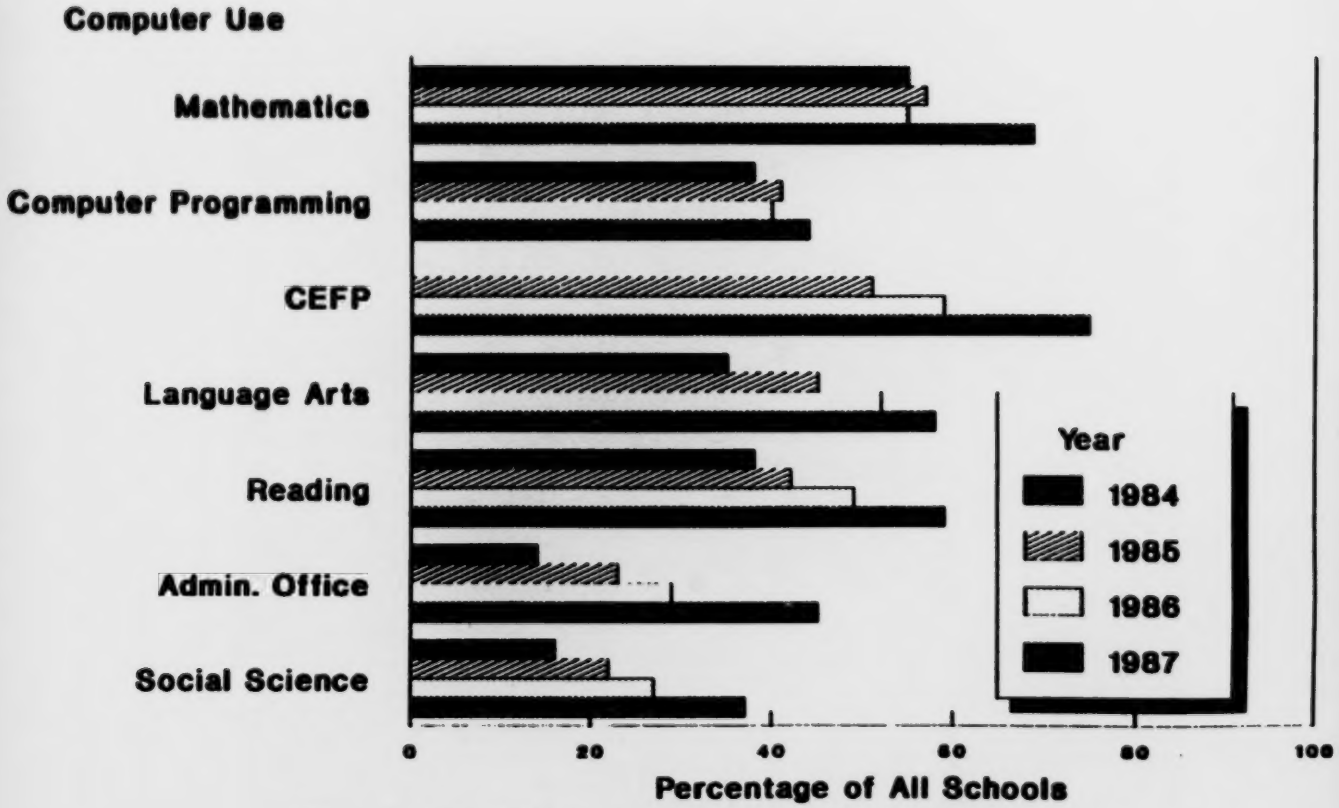

Figure 9. Percentage of all schools reporting selected computer uses, 1984-87

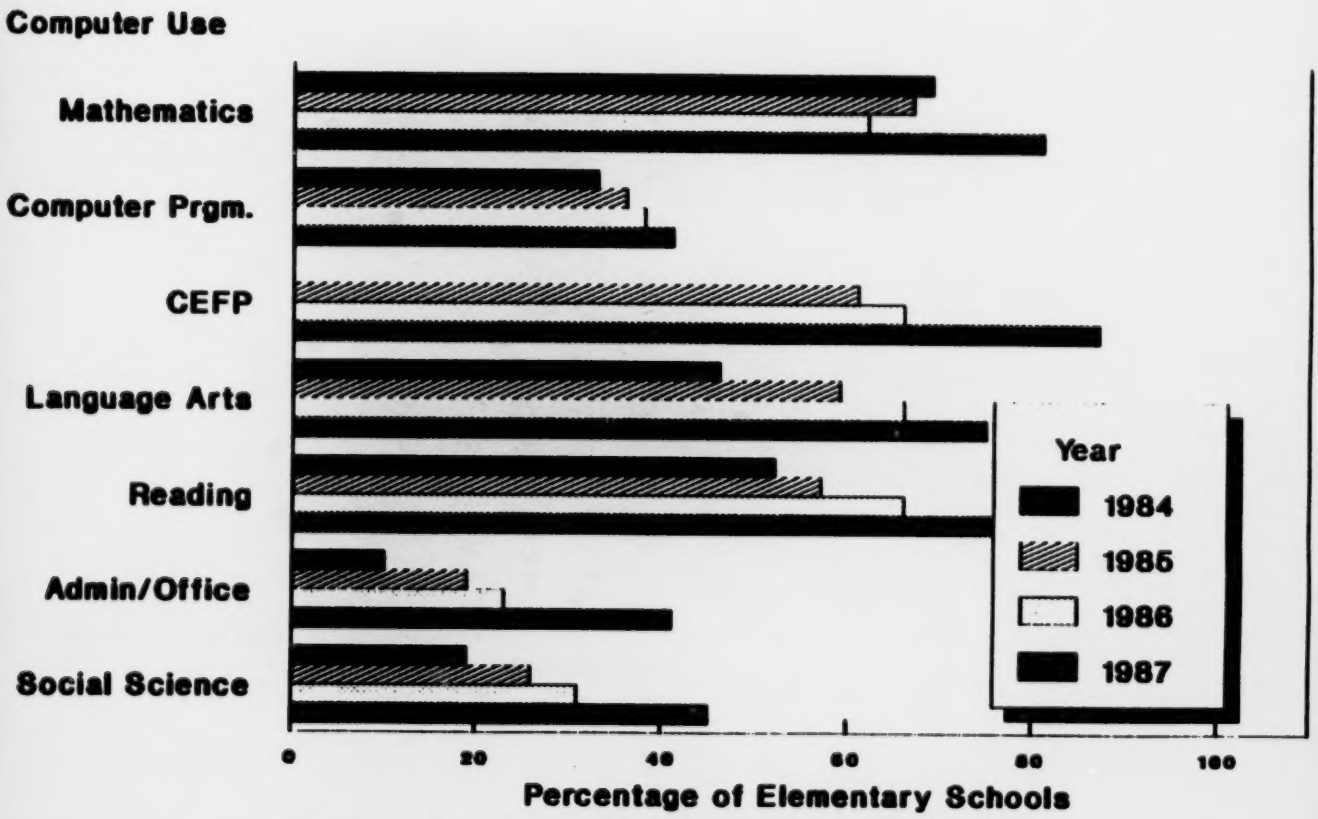

Figure 10. Percentage of elementary schools reporting selected computer uses, 1984-87.

schools in 1984, to 61.6% in 1987), followed by reading (from 27.4% of schools in 1984, to 54.8% in 1987) and social science (from 13.7% to 37.0% of schools in the same time period). These trends are reported in Table B-3 and are depicted in Figure 11.

Administrative/office applications also skyrocketed in senior high schools (from 28.6% of schools in 1984 to 85.7% in 1987). Mathematics related uses of computers rose the next greatest amount at this level (from 42.9% to 83.7% of schools between 1984 and 1987), followed by reading (from 12.7% to 34.7% in that same period), as shown in Table B-4 and Figure 12.

For the magnet/other category, the greatest increase was also for administrative and office uses (from 13.1% in 1984 to 37.2% in 1987). Language arts usage constituted the next largest increase in this category (from 18.1% of schools in 1984 to 31.7% in 1987); this application was followed by reading which increased from 17.6% to 30.7%. See Table B-5 and Figure 13.

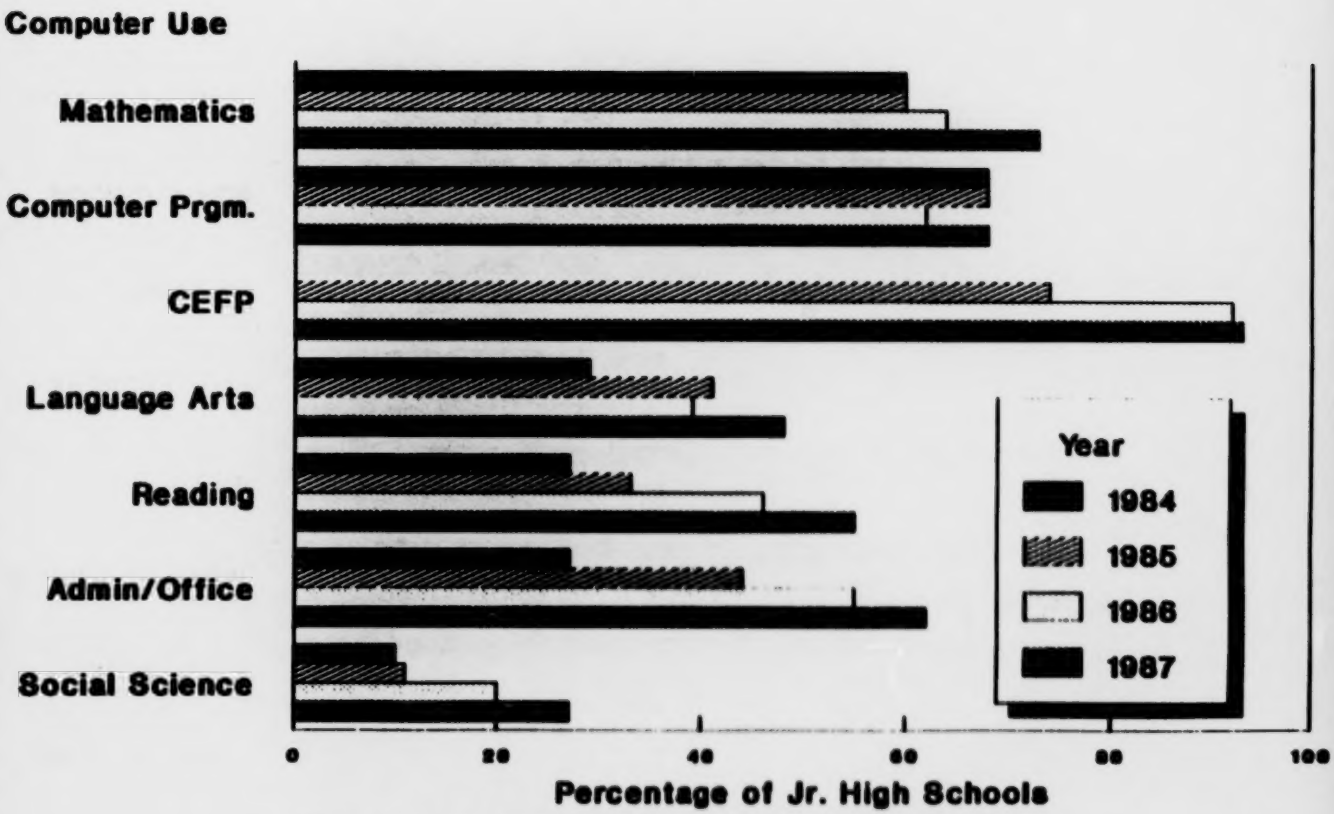

Figure 11. Percentage of junior high schools reporting selected uses, 1984-87.

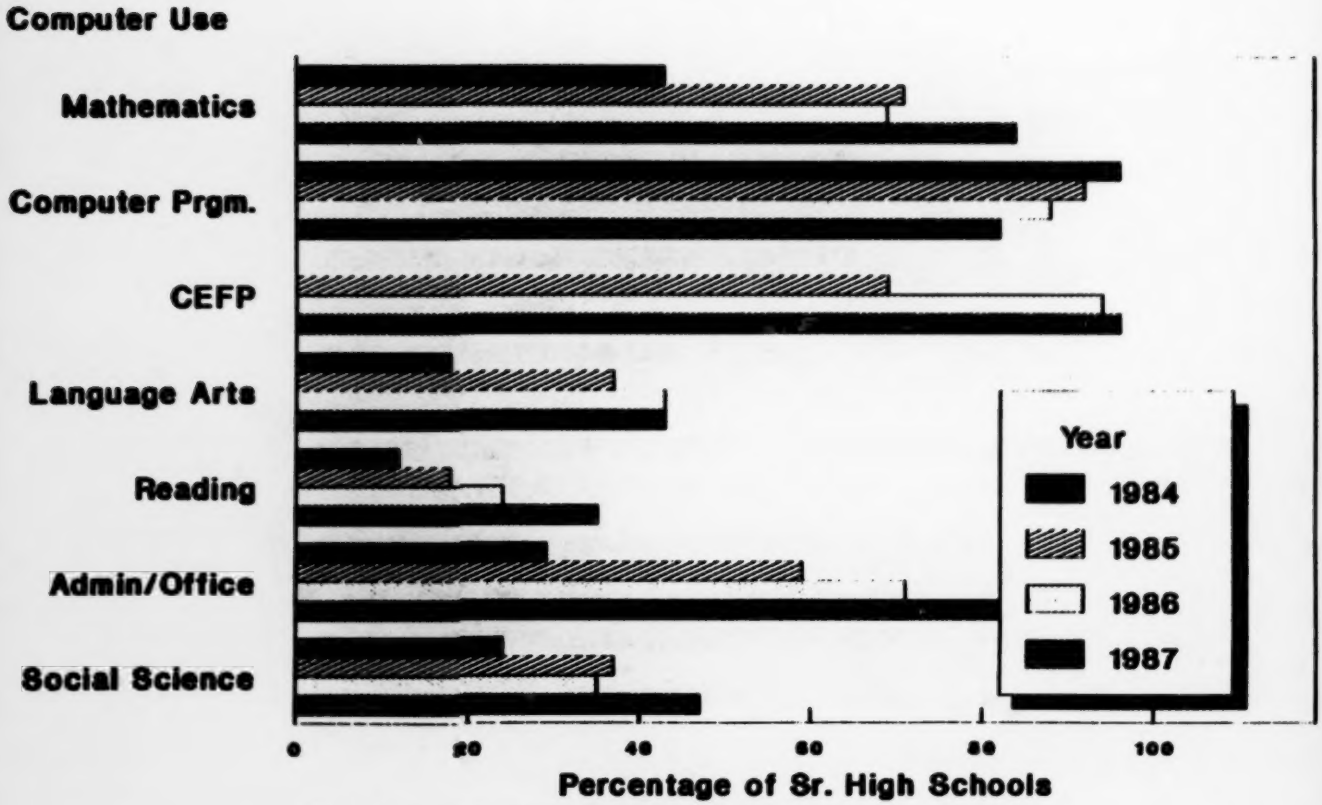

Figure 12. Percentage of senior high schools reporting selected computer uses, 1984-87.

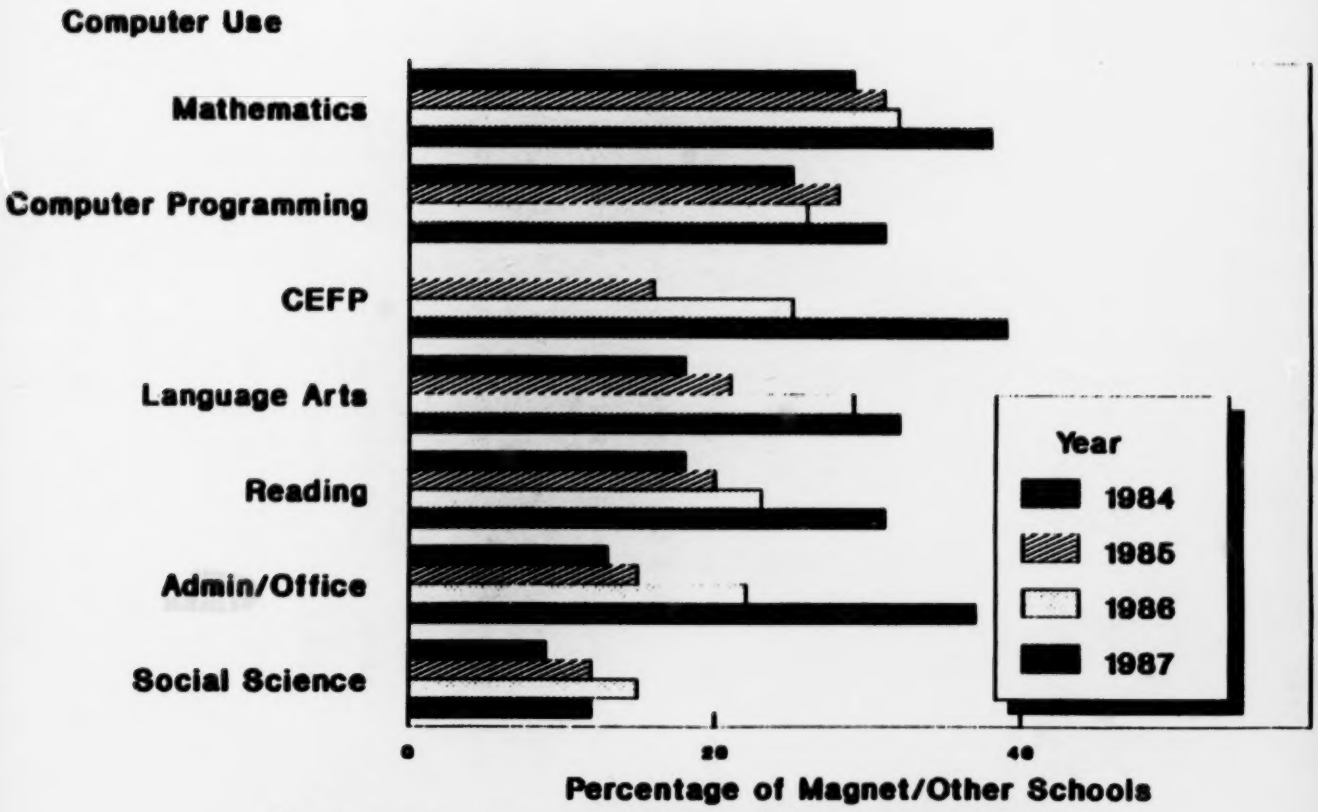

Figure 13. Percentage of magnet/other schools reporting selected computer uses, 1984-87.

Substitute for page 26 in text (2-9-90).

Summary and Recommendations

The findings presented in this report clearly indicate that the LAUSD is making significant efforts to increase the availability of microcomputers. In the 4-year period examined, there was a large increase in the number of microcomputers in the district, a trend which was reflected across all regions/divisions and at all levels.

Two implications of this increase are apparent. First, the student-per-microcomputer ratio has dropped markedly, suggesting the possibility that each student is able to spend more time with the computers. This, of course, depends upon the currency and availability of software and equipment, consultant support, and other factors. Additional research would determine whether, in fact, students are now able to spend more time with computers, and the proportion of computers that are not available for student use either because they are used solely by office/administrative staff, or they are obsolete.

Second, the variety of ways which the computers are reportedly used also increased significantly, suggesting a growing appreciation for the versatility of computers and a desire to make better use of this versatility. Indeed, a trend observed in the present data is toward greater use of computers for instruction of subjects such as reading and language arts, in addition to more traditional uses such as computer programming and mathematics.

While documenting these positive trends, this report also raises a number of questions which need to be addressed by further research. One set of questions relates directly to the acquisition of equipment and the implementation of software applications. This set includes: How is equipment selected? Are we selecting the best software to promote

educational growth of our students? How much time do students typically spend using the computers? Are teachers trained effectively? Is there a master plan to ensure interconnectivity of the equipment?

Other questions pertain to the effectiveness of computers in education. They include: How do students feel about the computers? What are the reactions of teachers? Is there evidence that instruction with the aid of a computer is better than without? Do follow-ups of graduates confirm the utility of their computer-related education? Answers to such questions would go far beyond merely documenting what has occurred and could help shape policies as they pertain to the acquisition and use of computer hardware and software.

Meaningful evaluation of the effectiveness of computers as instructional tools must focus on the elements of particular applications in the context of specific programs. As an example, a study is currently being planned to evaluate the effectiveness of computer-assisted instruction in high school algebra courses. This study will also address how computers can best be integrated with existing instructional delivery systems. Information derived from such research will be invaluable to educational planners.

Finally, planning and great care should be exercised in the development of measures intended to address questions such as those noted. If longitudinal comparisons are to be part of these follow ups, changes in format and content of questions from one year to the next should be avoided. This would prevent confounding of key information. In so doing, the possibility of misinterpretation of the findings would be eliminated.

References

Kulik, J., & Kulik, C. (1987). Review of recent research literature on computer-based instruction. Contemporary Educational Psychology, 12(3), 222-230.

Lawton, J., & Gerschner, V. (1982). A review of the literature on attitudes towards computers and computerized instruction. Journal of Research and Development in Education, 16(1), 50-55.

RMI.89,RSTEVE
092589

Appendix A

Computers in the Schools

Table A-1

Computers in the Schools: All Schools

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	96,840	120,012	148,978	171,260	168,364	198,041	214,367	242,789
Students using terminals	16,385	19,521	21,348	23,467	18,165	20,074	---	---
Computer rooms at school	1,114	---	2,830	---	3,931	---	4,812	---
Terminals at school	1,204	---	2,133	---	3,482	---	1,554	---
Apples at school	1,427	2,552	7,480	9,334	11,464	13,967	14,076	15,531
Ataris at school	153	199	208	214	188	201	159	160
Commodore Pets/ Vics at school	418	554	536	545	366	373	539	540
IBMs at school	100	190	197	236	401	755	976	1,284
TRS 80s at school	1,273	1,521	1,537	1,587	1,554	1,555	1,437	1,447
Other computers at school	414	513	493	520	492	508	614	645
Total micros at school	3,785	5,529	10,451	12,436	14,465	17,359	17,801	19,607

Table A-2

Computers in the Schools: All Elementary

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	55,947	71,953	84,889	100,421	94,861	116,742	129,026	145,675
Students using terminals	6,079	7,959	9,585	10,784	10,320	11,715	---	---
Computer rooms at school	602	---	1,801	---	2,664	---	3,209	---
Terminals at school	219	---	527	---	806	---	98	---
Apples at school	698	1,141	2,623	3,378	3,726	5,004	5,323	6,141
Ataris at school	30	37	58	59	45	53	37	37
Commodore Pets/ Vics at school	135	187	152	158	148	153	139	139
IBMs at school	1	6	5	11	6	58	188	321
TRS 80s at school	145	219	210	221	185	185	191	191
Other computers at school	135	176	111	115	97	108	121	121
Total micros at school	1,144	1,766	3,159	3,942	4,207	5,561	5,999	6,950

Table A-3

Computers in the Schools: All Junior High

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	18,899	21,579	28,508	30,906	33,090	34,635	34,293	38,269
Students using terminals	5,589	5,991	4,777	5,025	3,116	3,262	---	---
Computer rooms at school	131	---	263	---	384	---	468	---
Terminals at school	397	---	712	---	1,188	---	51	---
Apples at school	237	401	2,209	2,601	3,267	3,643	3,488	3,700
Ataris at school	60	66	75	80	62	62	50	50
Commodore Pets/ Vics at school	206	271	259	259	186	186	169	169
IBMs at school	0	0	1	1	8	34	32	50
TRS 80s at school	678	792	607	635	721	721	676	676
Other computers at school	21	27	102	102	45	45	39	40
Total micros at school	1,202	1,557	3,253	3,678	4,289	4,691	4,454	4,685

Table A-4

Computers in the Schools: All Senior High

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	12,839	16,182	23,802	26,054	23,233	25,841	27,077	31,327
Students using terminals	3,626	4,330	5,532	5,485	2,110	2,262	---	---
Computer rooms at school	193	---	414	---	377	---	437	---
Terminals at school	381	---	565	---	833	---	1,229	---
Apples at school	335	569	1,739	2,118	2,774	3,168	3,152	3,382
Ataris at school	61	84	64	64	72	77	69	69
Commodore Pets/ Vics at school	55	62	21	22	11	12	211	212
IBMs at school	79	130	101	104	136	174	174	272
TRS 80s at school	307	336	364	368	362	362	350	358
Other computers at school	142	146	162	184	194	196	197	224
Total micros at school	979	1,327	2,451	2,860	3,549	3,989	4,153	4,517

Table A-5

Computers in the Schools: Magnets/Other, All Grade Levels

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	9,155	10,298	11,779	13,879	17,180	20,823	23,971	27,527
Students using terminals	1,091	1,241	1,454	2,173	2,619	2,835	---	---
Computer rooms at school	188	---	352	---	506	---	698	---
Terminals at school	207	---	329	---	655	---	176	---
Apples at school	157	441	909	1,237	1,697	2,152	2,113	2,308
Ataris at school	2	12	11	11	9	9	3	4
Commodore Pets/ Vics at school	22	34	104	106	21	22	20	20
IBMs at school	20	54	90	120	251	489	582	641
TRS 80s at school	143	174	356	363	286	287	220	222
Other computers at school	116	127	118	119	156	159	257	260
Total micros at school	460	842	1,588	1,956	2,420	3,118	3,195	3,455

Table A-6

Computers in the Schools: Elementary, Region A

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	4,686	6,403	6,999	10,423	8,433	10,815	11,837	12,985
Students using terminals	1,132	1,053	775	1,034	380	573	---	---
Computer rooms at school	55	---	188	---	221	---	329	---
Terminals at school	11	---	29	---	37	---	5	---
Apples at school	70	92	246	316	348	480	512	628
Ataris at school	3	3	7	7	5	5	4	4
Commodore Pets/ Vics at school	4	5	6	6	3	3	3	3
IBMs at school	0	0	0	1	0	8	9	11
TRS 80s at school	2	2	3	3	2	2	2	2
Other computers at school	0	0	0	0	1	1	17	17
Total micros at school	79	102	262	333	359	499	547	665

Table A-7

Computers in the Schools: Elementary, Region B

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	6,889	9,076	13,255	14,819	13,248	15,338	20,341	22,777
Students using terminals	584	1,226	3,784	3,991	1,310	1,583	---	---
Computer rooms at school	43	---	198	---	548	---	317	---
Terminals at school	32	---	155	---	124	---	16	---
Apples at school	46	108	314	410	504	638	654	787
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	29	50	30	33	35	38	26	26
IBMs at school	0	0	3	6	3	8	38	77
TRS 80s at school	61	98	101	110	92	92	91	91
Other computers at school	6	10	4	4	12	12	15	15
Total micros at school	142	266	452	563	646	788	824	996

Table A-8

Computers in the Schools: Elementary, Region C

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	6,578	9,505	12,173	14,059	13,019	14,817	14,120	17,539
Students using terminals	1,474	2,159	939	1,018	981	1,439	---	---
Computer rooms at school	63	---	235	---	287	---	395	---
Terminals at school	44	---	39	---	172	---	18	---
Apples at school	89	191	352	415	460	626	607	684
Ataris at school	7	7	5	6	5	5	5	5
Commodore Pets/ Vics at school	27	37	24	26	19	19	27	27
IBMs at school	0	1	0	1	0	20	49	102
TRS 80s at school	5	10	12	13	12	12	11	11
Other computers at school	30	42	18	21	5	7	19	19
Total micros at school	158	288	411	482	501	689	718	848

Table A-9

Computers in the Schools: Elementary, Region D

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	9,186	10,886	11,789	12,950	12,428	15,587	17,569	17,909
Students using terminals	252	344	325	359	601	603	---	---
Computer rooms at school	105	---	268	---	323	---	482	---
Terminals at school	20	---	67	---	85	---	15	---
Apples at school	117	167	381	512	540	701	785	868
Ataris at school	17	23	28	28	29	29	23	23
Commodore Pets/ Vics at school	43	51	60	61	58	60	47	47
IBMs at school	0	0	0	0	0	3	31	33
TRS 80s at school	2	13	15	15	12	12	15	15
Other computers at school	33	46	30	30	16	25	21	21
Total micros at school	212	300	514	646	655	830	922	1,007

Table A-10

Computers in the Schools: Elementary, Region E

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	8,655	11,179	11,714	13,816	12,788	16,098	18,988	20,823
Students using terminals	629	700	562	597	1,444	1,635	---	---
Computer rooms at school	129	---	224	---	291	---	483	---
Terminals at school	24	---	32	---	71	---	8	---
Apples at school	105	142	337	427	450	640	681	788
Ataris at school	0	0	1	1	0	0	0	0
Commodore Pets/ Vics at school	17	17	16	16	19	19	21	21
IBMs at school	1	1	1	1	0	3	27	28
TRS 80s at school	18	18	12	12	15	15	21	21
Other computers at school	17	18	22	22	16	16	5	5
Total micros at school	158	196	389	479	500	693	755	863

Table A-11

Computers in the Schools: Elementary, Region F

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	7,791	9,265	12,823	14,826	13,456	16,931	18,504	21,519
Students using terminals	315	324	613	819	2,068	1,973	---	---
Computer rooms at school	68	---	243	---	256	---	368	---
Terminals at school	28	---	31	---	75	---	3	---
Apples at school	87	150	374	473	446	645	764	899
Ataris at school	3	4	5	5	3	11	2	2
Commodore Pets/ Vics at school	0	0	1	1	1	1	2	2
IBMs at school	0	4	1	1	1	9	16	17
TRS 80s at school	22	42	33	34	18	18	19	19
Other computers at school	23	26	20	20	17	17	17	17
Total micros at school	135	226	434	534	486	701	820	956

Table A-12

Computers in the Schools: Elementary, Region G

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	6,265	7,243	8,337	10,224	10,524	13,721	13,248	14,985
Students using terminals	187	280	1,127	1,296	1,988	2,299	---	---
Computer rooms at school	67	---	215	---	287	---	419	---
Terminals at school	18	---	78	---	114	---	6	---
Apples at school	88	122	286	401	469	626	632	717
Ataris at school	0	0	11	11	3	3	1	1
Commodore Pets/ Vics at school	13	25	12	12	10	10	10	10
IBMs at school	0	0	0	1	0	4	10	43
TRS 80s at school	17	18	17	17	18	18	20	20
Other computers at school	10	12	11	11	14	14	8	8
Total micros at school	128	177	337	453	514	675	681	799

Table A-13

Computers in the Schools: Elementary, Region H

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	5,897	8,396	7,799	9,304	10,965	13,435	14,419	17,138
Students using terminals	1,506	1,873	1,460	1,460	1,548	1,610	---	---
Computer rooms at school	72	---	230	---	451	---	416	---
Terminals at school	42	---	96	---	128	---	27	---
Apples at school	96	169	333	424	509	648	688	770
Ataris at school	0	0	1	1	0	0	2	2
Commodore Pets/ Vics at school	2	2	3	3	3	3	3	3
IBMs at school	0	0	0	0	2	2	8	10
TRS 80s at school	18	18	17	17	16	17	12	12
Other computers at school	16	22	6	7	16	16	19	19
Total micros at school	132	211	360	452	546	686	732	816

Table A-14

Computers in the Schools: Junior High, Region A

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	1,715	2,456	2,015	2,925	3,209	3,430	3,057	3,740
Students using terminals	42	122	24	24	0	0	---	---
Computer rooms at school	10	---	30	---	34	---	51	---
Terminals at school	2	---	26	---	0	---	2	---
Apples at school	24	86	250	326	395	424	437	482
Ataris at school	0	0	0	0	1	1	1	1
Commodore Pets/ Vics at school	21	43	16	16	8	8	6	6
IBMs at school	0	0	0	0	0	0	2	2
TRS 80s at school	46	49	36	36	35	35	20	20
Other computers at school	1	1	5	5	1	1	3	3
Total micros at school	92	179	307	383	440	469	469	514

Table A-15

Computers in the Schools: Junior High, Region B

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	2,345	2,345	6,060	6,370	4,312	4,473	3,547	3,635
Students using terminals	2,102	2,107	1,753	1,853	1,032	1,075	---	---
Computer rooms at school	22	---	42	---	44	---	30	---
Terminals at school	48	---	112	---	106	---	46	---
Apples at school	14	33	237	252	325	351	379	388
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	39	41	19	19	11	11	6	6
IBMs at school	0	0	0	0	2	2	5	6
TRS 80s at school	61	83	58	58	43	43	40	40
Other computers at school	0	1	17	17	0	0	0	0
Total micros at school	114	158	331	346	381	407	430	440

Table A-16

Computers in the Schools: Junior High, Region C

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	2,017	2,697	2,765	2,961	3,155	3,255	3,145	3,178
Students using terminals	2,032	2,265	2,171	2,234	290	294	---	---
Computer rooms at school	12	---	29	---	32	---	32	---
Terminals at school	75	---	72	---	225	---	0	---
Apples at school	31	60	236	293	356	387	383	386
Ataris at school	2	2	2	2	2	2	2	2
Commodore Pets/ Vics at school	0	10	0	0	0	0	0	0
IBMs at school	0	0	0	0	1	11	3	7
TRS 80s at school	31	33	27	27	33	33	34	34
Other computers at school	10	10	11	11	20	20	10	10
Total micros at school	74	115	276	333	412	453	432	439

Table A-17

Computers in the Schools: Junior High, Region D

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	3,328	3,386	3,366	3,399	4,937	5,144	4,521	4,586
Students using terminals	350	400	368	407	126	148	---	---
Computer rooms at school	18	---	28	---	65	---	76	---
Terminals at schools	36	---	21	---	71	---	1	---
Apples at school	39	48	263	329	488	566	514	531
Ataris at school	0	0	0	1	0	0	0	0
Commodore Pets/ Vics at school	17	17	43	43	44	44	40	40
IBMs at school	0	0	0	0	0	1	4	4
TRS 80s at school	104	117	97	102	112	112	85	85
Other computers at school	0	0	1	1	1	1	1	1
Total micros at school	160	182	404	476	645	724	644	661

Table A-18

Computers in the Schools: Junior High, Region E

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	2,192	2,378	3,030	3,243	4,507	3,687	4,466	5,218
Students using terminals	709	711	85	85	967	967	---	---
Computer rooms at school	22	---	39	---	54	---	65	---
Terminals at school	47	---	125	---	154	---	0	---
Apples at school	28	39	351	369	535	601	552	594
Ataris at school	38	44	48	48	40	40	32	32
Commodore Pets/ Vics at school	75	85	67	67	66	66	57	57
IBMs at school	0	0	1	1	1	4	5	14
TRS 80s at school	43	47	60	60	59	59	62	62
Other computers at school	0	5	2	2	1	1	2	2
Total micros at school	184	220	529	547	702	771	710	761

Table A-19

Computers in the Schools: Junior High, Region F

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	3,286	3,613	3,472	3,785	3,741	4,195	4,584	6,422
Students using terminals	48	86	258	301	585	662	---	---
Computer rooms at school	28	---	52	---	66	---	82	---
Terminals at school	60	---	89	---	293	---	2	---
Apples at school	59	90	417	493	611	663	619	644
Ataris at school	17	17	22	26	18	18	14	14
Commodore Pets/ Vics at school	28	36	39	39	37	37	40	40
IBMs at school	0	0	0	0	2	14	7	9
TRS 80s at school	49	61	71	88	122	122	105	105
Other computers at school	0	0	50	50	11	11	9	10
Total micros at school	153	204	599	696	801	865	794	822

Table A-20

Computers in the Schools: Junior High, Region G

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	2,664	3,124	5,750	5,860	6,396	6,396	5,986	5,980
Students using terminals	306	306	118	121	116	116	---	---
Computer rooms at school	10	---	17	---	26	---	54	---
Terminals at school	129	---	237	---	339	---	0	---
Apples at school	26	26	248	266	287	299	291	313
Ataris at school	3	3	3	3	1	1	1	1
Commodore Pets/ Vics at school	9	9	66	66	7	7	10	10
IBMs at school	0	0	0	0	2	2	6	8
TRS 80s at school	318	358	214	220	277	277	290	290
Other computers at school	10	10	0	0	0	0	0	0
Total micros at school	366	406	531	555	574	586	598	622

Table A-21

Computers in the Schools: Junior High, Region H

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	1,352	1,580	2,050	2,363	2,833	4,055	4,987	5,510
Students using terminals	0	0	0	0	0	0	---	---
Computer rooms at school	9	---	26	---	63	---	78	---
Terminals at school	0	---	30	---	0	---	0	---
Apples at school	16	19	207	273	270	352	313	362
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	17	30	9	9	13	13	10	10
IBMs at school	0	0	0	0	0	0	0	0
TRS 80s at school	26	44	44	44	40	40	40	40
Other computers at school	0	0	16	16	11	11	14	14
Total micros at school	59	93	276	342	334	416	377	426

Table A-22

Computers in the Schools: Elementary and Junior High Magnets, Region A

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	566	606	662	1,011	1,080	902	607	633
Students using terminals	0	0	0	0	439	259	---	---
Computer rooms at school	10	---	17	---	24	---	31	---
Terminals at school	1	---	1	---	30	---	0	---
Apples at school	2	5	24	38	30	34	28	35
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	1	1	0	0	1	1	0	0
IBMs at school	1	1	0	0	0	1	2	2
TRS 80s at school	3	3	7	7	4	4	3	3
Other computers at school	4	4	1	1	0	0	7	7
Total micros at school	11	14	32	46	35	40	40	47

Table A-23

Computers in the Schools: Elementary and Junior High Magnets, Region B

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	35	65	80	63	138	145	554	564
Students using terminals	0	0	0	0	0	0	---	---
Computer rooms at school	4	---	10	---	9	---	10	---
Terminals at school	0	---	0	---	0	---	1	---
Apples at school	0	0	2	2	12	15	46	48
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	0	0	0	0	0	0	0	0
IBMs at school	0	0	0	0	0	0	0	0
TRS 80s at school	2	6	2	6	2	2	2	2
Other computers at school	0	0	0	0	5	5	1	1
Total micros at school	2	6	4	8	19	22	49	51

Table A-24

Computers in the Schools: Elementary and Junior High Magnets, Region C

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	314	380	304	453	670	735	484	692
Students using terminals	33	33	55	80	0	0	--	---
Computer rooms at school	8	---	10	---	12	---	12	---
Terminals at school	0	---	9	---	0	---	0	---
Apples at school	3	24	13	22	21	33	43	58
Ataris at school	1	1	2	2	1	1	0	0
Commodore Pets/ Vics at school	0	6	0	0	0	0	0	0
IBMs at school	0	0	0	0	0	0	8	9
TRS 80s at school	7	7	7	7	6	6	6	6
Other computers at school	0	2	0	0	1	1	0	0
Total micros at school	11	40	22	31	29	41	57	73

Table A-25

Computers in the Schools: Elementary and Junior High Magnets, Region D

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	1,563	895	2,563	2,763	2,914	3,223	3,521	3,562
Students using terminals	25	27	33	45	100	120	---	---
Computer rooms at school	37	---	70	---	69	---	107	---
Terminals at school	40	---	11	---	2	---	0	---
Apples at school	25	33	125	187	243	372	276	293
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	1	1	10	10	1	1	6	6
IBMs at school	0	0	0	1	0	1	1	2
TRS 80s at school	11	24	31	31	19	19	13	13
Other computers at school	39	39	41	41	44	44	146	146
Total micros at school	76	97	207	270	307	437	442	460

Table A-26

Computers in the Schools: Elementary and Junior High Magnets, Region E

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	964	1,012	1,172	1,222	1,059	1,059	1,454	1,544
Students using terminals	0	0	0	0	330	330	---	---
Computer rooms at school	6	---	10	---	26	---	27	---
Terminals at school	22	---	0	---	55	---	0	---
Apples at school	8	9	20	34	66	77	89	91
Ataris at school	1	1	1	1	1	1	1	1
Commodore Pets/ Vics at school	0	0	2	3	4	4	2	2
IBMs at school	0	0	0	0	3	6	0	3
TRS 80s at school	26	26	26	27	9	10	9	9
Other computers at school	5	5	7	7	19	19	8	8
Total micros at school	40	41	56	72	102	117	109	114

Table A-27

Computers in the Schools: Elementary and Junior High Magnets, Region F

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	1,308	1,829	1,519	1,945	1,879	2,038	3,295	3,518
Students using terminals	0	43	181	586	211	211	---	---
Computer rooms at school	13	---	15	---	41	---	60	---
Terminals at school	35	---	2	---	53	---	2	---
Apples at school	8	29	51	64	150	173	234	245
Ataris at school	0	1	0	0	0	0	0	0
Commodore Pets/ Vics at school	0	0	1	1	0	0	0	0
IBMs at school	0	1	0	0	0	1	2	3
TRS 80s at school	28	40	28	30	62	62	64	64
Other computers at school	10	11	14	14	4	4	9	9
Total micros at school	46	82	94	109	216	240	309	321

Table A-28

Computers in the Schools: Elementary and Junior High Magnets, Region G

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	251	251	329	310	146	146	227	221
Students using terminals	81	81	0	0	1	1	---	---
Computer rooms at school	6	---	8	---	6	---	9	---
Terminals at school	11	---	61	---	1	---	0	---
Apples at school	1	1	1	1	5	7	26	36
Ataris at school	0	0	58	58	0	0	0	0
Commodore Pets/ Vics at school	0	0	60	60	0	0	0	0
IBMs at school	0	0	0	0	0	0	0	0
TRS 80s at school	12	12	84	84	6	6	6	6
Other computers at school	0	0	0	0	0	0	0	0
Total micros at school	13	13	202	202	11	13	32	42

Table A-29

Computers in the Schools: Elementary and Junior High Magnets, Region H

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	137	177	263	262	435	435	354	344
Students using terminals	0	0	0	0	0	0	---	---
Computer rooms at school	3	---	7	---	8	---	10	---
Terminals at school	0	---	0	---	27	---	0	---
Apples at school	0	1	5	8	21	23	28	28
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	0	0	0	0	0	0	0	0
IBMs at school	0	0	0	0	0	0	0	0
TRS 80s at school	5	5	10	10	10	10	6	6
Other computers at school	0	0	0	0	0	0	0	0
Total micros at school	5	6	15	18	31	33	34	34

Table A-30

Computers in the Schools: Senior High Division Magnets/Other

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	2,147	2,696	2,130	2,545	3,855	4,934	5,889	7,044
Students using terminals	627	676	522	769	578	681	---	---
Computer rooms at school	51	---	121	---	147	---	218	---
Terminals at school	40	---	74	---	190	---	166	---
Apples at school	61	156	313	431	651	801	475	570
Ataris at school	0	9	8	8	7	7	2	3
Commodore Pets/ Vics at school	15	15	3	3	7	7	4	4
IBMs at school	14	46	51	51	74	85	42	52
TRS 80s at school	11	12	89	89	114	114	50	52
Other computers at school	7	7	10	11	15	17	6	8
Total micros at school	108	245	474	593	868	1,031	579	689

Table A-31

Computers in the Schools: Special Education

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	806	1,274	1,450	1,625	1,720	2,328	2,404	2,683
Students using terminals	5	40	152	203	285	302	---	---
Computer rooms at school	26	---	37	---	75	---	97	---
Terminals at school	17	---	18	---	83	---	3	---
Apples at school	29	50	90	128	152	212	255	283
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	0	0	0	0	0	1	1	1
IBMs at school	0	0	0	0	0	4	11	20
TRS 80s at school	2	2	3	3	3	3	4	4
Other computers at school	10	12	10	10	17	17	15	15
Total micros at school	41	64	103	141	172	237	286	323

Table A-32

Computers in the Schools: Adult and Occupational Education

Item	Fall 1984	Spring 1985 (expected)	Fall 1985	Spring 1986 (expected)	Fall 1986	Spring 1987 (expected)	Fall 1987	Spring 1988 (expected)
Students using micros	1,064	1,113	1,307	1,680	3,284	4,878	5,182	6,722
Students using terminals	320	341	511	490	675	931	---	---
Computer rooms at school	24	---	47	---	89	---	117	---
Terminals at school	41	---	153	---	214	---	4	---
Apples at school	20	133	208	265	346	405	613	621
Ataris at school	0	0	0	0	0	0	0	0
Commodore Pets/ Vics at school	5	11	28	29	8	8	7	7
IBMs at school	5	6	39	68	174	391	516	550
TRS 80s at school	36	37	69	69	51	51	57	57
Other computers at school	41	47	35	35	51	52	65	66
Total micros at school	107	234	379	466	630	907	1,258	1,301

RCUSAGE1.RLEO

Appendix B

Computer Applications in the Schools

Table B-1

Computer Applications in the Schools: All Schools

Uses	Number of schools							
	Fall 1984 (N = 731)		Fall 1985 (N = 726)		Fall 1986 (N = 730)		Fall 1987 (N = 734)	
	n	%	n	%	n	%	n	%
Administrative office	101	13.8	169	23.3	215	29.5	330	45.0
Business education	53	7.3	70	9.6	88	12.1	101	13.8
Computer Education Foundation Program	--	--	371	51.1	433	59.3	551	75.1
Computer programming	280	38.3	296	40.8	295	40.4	320	43.6
Foreign language	13	1.8	17	2.3	25	3.4	40	5.4
Guidance	29	4.0	45	6.2	66	9.0	69	9.4
Health	14	1.9	18	2.5	24	3.3	38	5.2
Home economics	3	0.4	6	0.8	21	2.9	29	4.0
Industrial arts	19	2.6	43	5.9	66	9.0	80	10.9
Language arts	253	34.6	326	44.9	378	51.8	429	58.4
Mathematics	403	55.1	414	57.0	400	54.8	504	68.7
Music	14	1.9	31	4.3	39	5.3	46	6.3
Reading	275	37.6	306	42.1	361	49.5	435	59.3
Social science	117	16.0	157	21.6	195	26.7	270	36.8
Testing	80	10.9	109	15.0	110	15.1	123	16.8
Other	160	21.9	149	20.5	116	15.9	137	18.7

Table B-2

Computer Applications in the Schools: All Elementary

Uses	Number of schools			
	Fall 1984 (n = 410)	Fall 1985 (n = 410)	Fall 1986 (n = 410)	Fall 1987 (n = 413)
Administrative office	41	78	96	169
Business education	0	0	3	3
Computer Education Foundation Program	--	252	269	359
Computer programming	134	146	155	168
Foreign language	1	4	7	13
Guidance	5	3	8	7
Health	7	11	11	16
Home economics	0	0	1	3
Industrial arts	1	2	5	0
Language arts	187	237	271	310
Mathematics	281	275	255	336
Music	12	18	24	25
Reading	214	234	269	317
Social science	77	105	128	187
Testing	57	67	62	70
Other	95	67	39	52

Table B-3

Computer Applications in the Schools: All Junior High

Uses	Number of schools			
	Fall 1984 (n = 73)	Fall 1985 (n = 73)	Fall 1986 (n = 74)	Fall 1987 (n = 73)
Administrative office	20	32	41	45
Business education	9	14	16	19
Computer Education Foundation Program	---	54	68	68
Computer programming	50	50	46	50
Foreign language	6	6	7	11
Guidance	5	10	17	19
Health	3	1	9	11
Home economics	1	1	3	7
Industrial arts	2	6	13	18
Language arts	21	30	29	35
Mathematics	44	44	47	53
Music	1	4	6	7
Reading	20	24	34	40
Social science	10	11	20	27
Testing	8	13	14	10
Other	22	28	25	27

Table B-4

Computer Applications in the Schools: All Senior High

Uses	Number of schools			
	Fall 1984 (n = 49)	Fall 1985 (n = 49)	Fall 1986 (n = 49)	Fall 1987 (n = 49)
Administrative office	14	29	35	42
Business education	30	35	43	42
Computer Education Foundation Program	---	34	46	47
Computer programming	47	45	43	40
Foreign language	2	4	4	9
Guidance	13	19	26	26
Health	0	2	1	4
Home economics	1	4	11	15
Industrial arts	11	25	33	44
Language arts	9	18	21	21
Mathematics	21	35	34	41
Music	0	2	4	4
Reading	6	9	12	17
Social science	12	18	17	23
Testing	7	12	21	20
Other	13	27	26	25

Table B-5

Computer Applications in the Schools: Magnets/Other, All Grade Levels

Uses	Number of schools			
	Fall 1984 (n = 199)	Fall 1985 (n = 194)	Fall 1986 (n = 197)	Fall 1987 (n = 199)
Administrative office	26	30	43	74
Business education	14	21	26	37
Computer Education Foundation Program	---	31	50	77
Computer programming	49	55	51	62
Foreign language	4	3	7	7
Guidance	6	13	15	17
Health	4	4	3	7
Home economics	1	1	6	4
Industrial arts	5	10	15	18
Language arts	36	41	57	63
Mathematics	57	60	64	75
Music	1	7	5	10
Reading	35	39	46	61
Social science	18	23	30	33
Testing	8	17	13	23
Other	30	27	26	33

Note. Includes Elementary and Junior High School Magnets (Region A-H), Senior High Division Magnets Other Schools, Special Education, Adult and Occupational Schools/Centers.

Table B-6

Computer Applications in the Schools: Elementary, Region A

Uses	Number of schools			
	Fall 1984 (n = 51)	Fall 1985 (n = 51)	Fall 1986 (n = 51)	Fall 1987 (n = 51)
Administrative office	2	7	7	12
Business education	0	0	1	1
Computer Education Foundation Program	---	28	25	45
Computer programming	8	13	13	15
Foreign language	0	1	2	3
Guidance	0	0	1	0
Health	0	1	1	2
Home economics	0	0	0	1
Industrial arts	0	0	0	0
Language arts	20	35	35	37
Mathematics	37	38	42	40
Music	2	5	3	5
Reading	27	34	39	35
Social science	9	18	18	23
Testing	4	9	7	5
Other	8	5	2	5

Table B-7

Computer Applications in the Schools: Elementary, Region B

Uses	Number of schools			
	Fall 1984 (n = 37)	Fall 1985 (n = 37)	Fall 1986 (n = 37)	Fall 1987 (n = 38)
Administrative office	6	13	9	30
Business education	0	0	1	0
Computer Education Foundation Program	---	25	23	33
Computer programming	14	11	14	21
Foreign language	0	0	0	1
Guidance	3	2	1	3
Health	1	3	1	3
Home economics	0	0	0	0
Industrial arts	0	0	2	0
Language arts	15	22	22	25
Mathematics	24	26	3	30
Music	0	1	3	3
Reading	18	21	24	32
Social science	5	11	11	15
Testing	4	8	10	14
Other	6	7	4	6

Table B-8

Computer Applications in the Schools: Elementary, Region C

Uses	Number of schools			
	Fall 1984 (n = 43)	Fall 1985 (n = 43)	Fall 1986 (n = 43)	Fall 1987 (n = 43)
Administrative office	5	9	10	16
Business education	0	0	0	0
Computer Education Foundation Program	---	25	27	32
Computer programming	8	13	15	10
Foreign language	0	1	1	0
Guidance	0	0	0	1
Health	0	1	1	2
Home economics	0	0	0	0
Industrial arts	0	0	0	0
Language arts	18	22	30	33
Mathematics	33	32	36	35
Music	0	0	1	2
Reading	24	29	29	35
Social science	4	7	12	17
Testing	13	15	11	10
Other	10	4	2	7

Table B-9

Computer Applications in the Schools: Elementary, Region D

Uses	Number of schools			
	Fall 1984 (n = 61)	Fall 1985 (n = 61)	Fall 1986 (n = 61)	Fall 1987 (n = 62)
Administrative office	7	9	13	18
Business education	0	0	0	0
Computer Education Foundation Program	---	37	41	55
Computer programming	20	22	28	26
Foreign language	1	0	2	2
Guidance	1	0	2	2
Health	1	1	1	2
Home economics	0	0	0	0
Industrial arts	0	0	0	0
Language arts	25	35	36	46
Mathematics	37	41	45	52
Music	1	2	3	4
Reading	24	35	34	48
Social science	8	17	17	33
Testing	8	5	5	9
Other	15	17	11	5

Table B-10

Computer Applications in the Schools: Elementary, Region E

Uses	Number of schools			
	Fall 1984 (n = 67)	Fall 1985 (n = 67)	Fall 1986 (n = 67)	Fall 1987 (n = 67)
Administrative office	1	5	6	18
Business education	0	0	0	0
Computer Education Foundation Program	---	44	44	57
Computer programming	21	23	20	18
Foreign language	0	1	0	3
Guidance	0	0	1	0
Health	0	1	2	1
Home economics	0	0	0	1
Industrial arts	0	0	1	0
Language arts	32	35	46	51
Mathematics	41	39	47	55
Music	3	3	4	4
Reading	32	31	43	51
Social science	13	11	21	28
Testing	2	6	4	3
Other	21	7	8	8

Table B-11

Computer Applications in the Schools: Elementary, Region F

Uses	Number of schools			
	Fall 1984 (n = 60)	Fall 1985 (n = 60)	Fall 1986 (n = 60)	Fall 1987 (n = 60)
Administrative office	2	7	12	21
Business education	0	0	1	0
Computer Education Foundation Program	---	35	42	54
Computer programming	22	25	24	33
Foreign language	0	1	0	2
Guidance	0	0	1	0
Health	1	1	1	2
Home economics	0	0	1	0
Industrial arts	0	1	1	0
Language arts	31	34	36	43
Mathematics	42	37	37	49
Music	2	2	6	1
Reading	36	36	32	44
Social science	16	19	18	27
Testing	7	11	5	6
Other	17	12	7	10

Table B-12

Computer Applications in the Schools: Elementary, Region G

Uses	Number of schools			
	Fall 1984 (n = 46)	Fall 1985 (n = 46)	Fall 1986 (n = 46)	Fall 1987 (n = 46)
Administrative office	8	10	17	29
Business education	0	0	0	1
Computer Education Foundation Program	---	29	32	41
Computer programming	18	15	19	19
Foreign language	0	0	1	0
Guidance	1	1	1	1
Health	3	1	3	2
Home economics	0	0	0	1
Industrial arts	1	0	1	0
Language arts	26	24	29	37
Mathematics	33	28	34	38
Music	2	2	2	3
Reading	28	25	33	38
Social science	11	8	13	21
Testing	11	6	10	11
Other	9	11	3	6

Table B-13

Computer Applications in the Schools: Elementary, Region H

Uses	Number of schools			
	Fall 1984 (n = 45)	Fall 1985 (n = 45)	Fall 1986 (n = 45)	Fall 1987 (n = 46)
Administrative office	10	18	22	25
Business education	0	0	0	1
Computer Education Foundation Program	---	29	35	42
Computer programming	23	24	22	26
Foreign language	0	0	1	2
Guidance	0	0	1	0
Health	1	2	1	2
Home economics	0	0	0	0
Industrial arts	0	1	0	0
Language arts	20	30	37	38
Mathematics	34	34	11	37
Music	2	3	2	3
Reading	25	23	35	34
Social science	11	14	18	23
Testing	8	7	10	12
Other	9	4	2	5

Table B-14

Computer Applications in the Schools: Junior High, Region A

Uses	Number of schools			
	Fall 1984 (n = 9)	Fall 1985 (n = 9)	Fall 1986 (n = 9)	Fall 1987 (n = 9)
Administrative office	2	4	4	7
Business education	3	2	2	3
Computer Education Foundation Program	---	6	9	9
Computer programming	6	3	3	6
Foreign language	1	2	2	3
Guidance	1	1	2	3
Health	0	0	2	0
Home economics	0	0	1	2
Industrial arts	0	1	4	3
Language arts	4	4	3	4
Mathematics	5	6	6	7
Music	0	0	1	0
Reading	1	3	4	2
Social science	3	2	2	2
Testing	2	0	2	0
Other	2	5	1	3

Table B-15

Computer Applications in the Schools: Junior High, Region B

Uses	Number of schools			
	Fall 1984 (n = 6)	Fall 1985 (n = 6)	Fall 1986 (n = 6)	Fall 1987 (n = 6)
Administrative office	2	2	4	4
Business education	0	1	1	1
Computer Education Foundation Program	---	6	5	5
Computer programming	3	5	5	4
Foreign language	0	0	0	0
Guidance	0	2	3	1
Health	0	0	2	1
Home economics	0	0	1	0
Industrial arts	0	0	2	2
Language arts	4	4	5	4
Mathematics	4	4	5	5
Music	0	0	1	0
Reading	4	4	5	5
Social science	0	0	1	2
Testing	0	1	3	1
Other	2	2	4	2

Table B-16

Computer Applications in the Schools: Junior High, Region C

Uses	Number of schools			
	Fall 1984 (n = 8)	Fall 1985 (n = 8)	Fall 1986 (n = 8)	Fall 1987 (n = 8)
Administrative office	1	4	4	4
Business education	1	1	2	0
Computer Education Foundation Program	---	6	8	8
Computer programming	3	2	2	3
Foreign language	0	0	0	0
Guidance	1	0	1	1
Health	0	0	0	0
Home economics	0	0	0	0
Industrial arts	0	1	1	2
Language arts	1	5	2	1
Mathematics	4	7	4	2
Music	0	0	0	1
Reading	4	2	2	3
Social science	0	1	0	2
Testing	1	2	1	1
Other	2	2	0	0

Table B-17

Computer Applications in the Schools: Junior High, Region D

Uses	Number of schools			
	Fall 1984 (n = 12)	Fall 1985 (n = 12)	Fall 1986 (n = 12)	Fall 1987 (n = 11)
Administrative office	1	4	5	3
Business education	1	2	4	5
Computer Education Foundation Program	---	6	11	11
Computer programming	8	7	9	9
Foreign language	0	0	1	1
Guidance	1	1	2	1
Health	0	0	1	2
Home economics	0	0	1	1
Industrial arts	0	1	0	2
Language arts	3	2	5	8
Mathematics	7	5	8	8
Music	0	0	1	1
Reading	2	1	6	6
Social science	1	0	5	7
Testing	1	1	1	2
Other	2	3	4	1

Table B-18

Computer Applications in the Schools: Junior High, Region E

Uses	Number of schools			
	Fall 1984 (n = 12)	Fall 1985 (n = 12)	Fall 1986 (n = 12)	Fall 1987 (n = 12)
Administrative office	5	4	6	6
Business education	2	2	2	2
Computer Education Foundation Program	---	11	12	12
Computer programming	11	12	9	8
Foreign language	2	0	0	3
Guidance	2	4	4	3
Health	0	0	1	3
Home economics	0	0	0	0
Industrial arts	1	0	2	4
Language arts	3	4	6	7
Mathematics	8	5	6	10
Music	0	0	0	1
Reading	3	5	5	7
Social science	2	1	1	4
Testing	2	3	3	3
Other	5	3	5	6

Table B-19

Computer Applications in the Schools: Junior High, Region F

Uses	Number of schools			
	Fall 1984 (n = 14)	Fall 1985 (n = 14)	Fall 1986 (n = 15)	Fall 1987 (n = 15)
Administrative office	5	7	9	10
Business education	1	3	2	2
Computer Education Foundation Program	---	8	13	14
Computer programming	13	12	9	11
Foreign language	3	3	2	1
Guidance	0	0	2	3
Health	2	0	1	1
Home economics	1	1	0	0
Industrial arts	0	2	2	2
Language arts	3	4	2	3
Mathematics	8	8	10	10
Music	0	3	2	2
Reading	2	4	6	8
Social science	3	4	6	5
Testing	1	3	3	1
Other	5	7	6	10

Table B-20

Computer Applications in the Schools: Junior High, Region G

Uses	Number of schools			
	Fall 1984 (n = 6)	Fall 1985 (n = 6)	Fall 1986 (n = 6)	Fall 1987 (n = 6)
Administrative office	3	4	4	5
Business education	1	1	0	1
Computer Education Foundation Program	---	5	4	4
Computer programming	5	5	4	4
Foreign language	0	1	1	1
Guidance	0	2	2	2
Health	1	1	1	0
Home economics	0	0	0	1
Industrial arts	1	1	1	0
Language arts	2	5	3	3
Mathematics	4	6	4	5
Music	1	1	1	0
Reading	2	4	4	4
Social science	1	2	2	1
Testing	1	3	1	1
Other	2	2	2	3

Table B-21

Computer Applications in the Schools: Junior High, Region H

Uses	Number of schools			
	Fall 1984 (n = 6)	Fall 1985 (n = 6)	Fall 1986 (n = 6)	Fall 1987 (n = 6)
Administrative office	1	3	5	6
Business education	0	2	3	5
Computer Education Foundation Program	---	6	6	5
Computer programming	1	4	5	5
Foreign language	0	0	1	2
Guidance	0	0	1	5
Health	0	0	1	4
Home economics	0	0	0	3
Industrial arts	0	0	1	3
Language arts	1	2	3	5
Mathematics	4	3	4	6
Music	0	0	0	2
Reading	2	1	2	5
Social science	0	1	3	4
Testing	0	0	0	1
Other	2	4	3	2

Table B-22

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region A

Uses	Number of schools			
	Fall 1984 (n = 7)	Fall 1985 (n = 7)	Fall 1986 (n = 7)	Fall 1987 (n = 7)
Administrative office	0	1	0	1
Business education	0	0	0	0
Computer Education Foundation Program	---	3	3	4
Computer programming	3	4	2	2
Foreign language	1	0	0	0
Guidance	0	0	0	0
Health	0	1	0	0
Home economics	0	0	0	0
Industrial arts	0	0	0	0
Language arts	4	5	5	5
Mathematics	5	6	4	5
Music	0	1	0	0
Reading	4	4	3	4
Social science	3	2	1	1
Testing	0	0	0	0
Other	1	1	0	2

Table B-23

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region B

Uses	Number of schools			
	Fall 1984 (n = 5)	Fall 1985 (n = 5)	Fall 1986 (n = 5)	Fall 1987 (n = 5)
Administrative office	0	0	1	3
Business education	0	0	0	0
Computer Education Foundation Program	---	3	1	2
Computer programming	2	1	0	4
Foreign language	0	0	0	0
Guidance	0	0	1	0
Health	0	0	1	1
Home economics	0	0	0	0
Industrial arts	0	0	0	1
Language arts	1	1	1	3
Mathematics	3	1	1	3
Music	0	0	0	0
Reading	1	0	1	3
Social science	0	0	0	1
Testing	0	0	0	0
Other	1	1	0	0

Table B-24

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region C

Uses	Number of schools			
	Fall 1984 (n = 5)	Fall 1985 (n = 5)	Fall 1986 (n = 5)	Fall 1987 (n = 5)
Administrative office	0	0	1	1
Business education	0	0	0	0
Computer Education Foundation Program	---	2	2	4
Computer programming	2	3	2	0
Foreign language	0	0	0	0
Guidance	0	0	0	1
Health	0	0	0	0
Home economics	0	0	0	0
Industrial arts	0	0	0	0
Language arts	1	1	1	3
Mathematics	3	1	1	2
Music	0	0	0	0
Reading	2	1	1	2
Social science	1	1	0	0
Testing	1	0	0	0
Other	3	0	1	1

Table B-25

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region D

Uses	Number of schools			
	Fall 1984 (n = 14)	Fall 1985 (n = 15)	Fall 1986 (n = 15)	Fall 1987 (n = 15)
Administrative office	0	3	3	5
Business education	0	2	3	2
Computer Education Foundation Program	---	5	5	9
Computer programming	8	13	9	10
Foreign language	0	1	1	1
Guidance	1	3	3	0
Health	0	1	0	0
Home economics	0	0	0	0
Industrial arts	0	1	0	0
Language arts	4	6	9	10
Mathematics	6	9	10	10
Music	0	2	1	1
Reading	4	8	8	8
Social science	3	2	7	8
Testing	2	3	1	3
Other	3	5	2	4

Table B-26

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region E

Uses	Number of schools			
	Fall 1984 (n = 7)	Fall 1985 (n = 7)	Fall 1986 (n = 7)	Fall 1987 (n = 7)
Administrative office	1	2	0	1
Business education	0	0	0	0
Computer Education Foundation Program	---	3	5	6
Computer programming	5	4	3	4
Foreign language	0	0	0	0
Guidance	1	0	1	0
Health	0	0	0	0
Home economics	0	0	0	0
Industrial arts	0	0	0	0
Language arts	3	1	4	3
Mathematics	4	4	5	4
Music	0	0	1	1
Reading	2	0	4	3
Social science	1	1	3	2
Testing	1	0	0	0
Other	1	2	1	0

Table B-27

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region F

Uses	Number of schools			
	Fall 1984 (n = 12)	Fall 1985 (n = 12)	Fall 1986 (n = 12)	Fall 1987 (n = 12)
Administrative office	1	2	3	6
Business education	0	0	0	1
Computer Education Foundation Program	---	1	5	9
Computer programming	6	6	6	8
Foreign language	2	0	0	0
Guidance	0	0	1	1
Health	2	0	0	1
Home economics	1	0	0	0
Industrial arts	0	0	1	1
Language arts	3	3	3	6
Mathematics	6	6	7	9
Music	0	0	0	1
Reading	3	4	6	9
Social science	3	3	5	6
Testing	0	1	3	2
Other	3	4	2	3

Table B-28

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region G

Uses	Number of schools			
	Fall 1984 (n = 6)	Fall 1985 (n = 6)	Fall 1986 (n = 6)	Fall 1987 (n = 6)
Administrative office	1	1	0	1
Business education	0	0	0	0
Computer Education Foundation Program	---	1	0	1
Computer programming	2	2	1	1
Foreign language	0	1	0	0
Guidance	0	1	0	1
Health	0	1	0	0
Home economics	0	0	0	0
Industrial arts	0	1	0	0
Language arts	2	2	1	1
Mathematics	3	3	2	3
Music	0	1	0	0
Reading	1	2	1	1
Social science	0	2	1	1
Testing	0	1	0	0
Other	1	0	0	1

Table B-29

Computer Applications in the Schools: Magnets (Elementary and Junior High), Region H

Uses	Number of schools			
	Fall 1984 (n = 3)	Fall 1985 (n = 3)	Fall 1986 (n = 3)	Fall 1987 (n = 3)
Administrative office	0	0	0	0
Business education	0	0	0	0
Computer Education Foundation Program	---	1	1	3
Computer programming	1	1	1	1
Foreign language	0	0	0	0
Guidance	0	0	0	0
Health	0	0	0	0
Home economics	0	0	0	0
Industrial arts	0	0	1	0
Language arts	0	1	2	3
Mathematics	1	2	2	3
Music	0	0	0	1
Reading	1	1	1	3
Social science	1	1	1	2
Testing	0	0	0	2
Other	0	1	0	0

Table B-30

Computer Applications in the Schools, Magnets/Other, Senior High Division

Uses	Number of schools			
	Fall 1984 (n = 81)	Fall 1985 (n = 78)	Fall 1986 (n = 80)	Fall 1987 (n = 82)
Administrative office	2	4	7	14
Business education	6	4	7	10
Computer Education Foundation Program	---	5	9	14
Computer programming	13	7	9	14
Foreign language	0	1	4	2
Guidance	3	4	6	7
Health	1	1	0	3
Home economics	0	0	3	3
Industrial arts	2	3	6	9
Language arts	3	5	7	8
Mathematics	8	7	9	15
Music	0	1	1	4
Reading	3	1	3	6
Social science	4	5	6	7
Testing	2	5	5	7
Other	8	8	7	10

Table B-31

Computer Applications in the Schools, Special Education

Uses	Number of schools			
	Fall 1984 (n = 18)	Fall 1985 (n = 18)	Fall 1986 (n = 18)	Fall 1987 (n = 18)
Administrative office	15	11	16	17
Business education	0	0	0	2
Computer Education Foundation Program	---	7	11	13
Computer programming	3	2	7	6
Foreign language	1	0	1	3
Guidance	0	0	1	2
Health	1	0	2	2
Home economics	0	0	2	0
Industrial arts	0	0	0	0
Language arts	13	12	18	16
Mathematics	14	15	18	15
Music	1	2	2	2
Reading	12	15	17	15
Social science	2	5	5	4
Testing	0	3	2	4
Other	5	2	8	3

Table B-32

Computer Applications in the Schools: Adult and Occupational Education

Uses	Number of schools			
	Fall 1984 (n = 41)	Fall 1985 (n = 38)	Fall 1986 (n = 39)	Fall 1987 (n = 39)
Administrative office	6	6	12	25
Business education	8	15	16	22
Computer Education Foundation Program	---	0	8	12
Computer programming	4	12	11	12
Foreign language	0	0	1	1
Guidance	1	5	2	5
Health	0	0	0	0
Home economics	0	1	1	1
Industrial arts	3	5	7	7
Language arts	2	4	6	5
Mathematics	4	6	5	6
Music	0	0	0	0
Reading	2	3	1	7
Social science	0	1	1	1
Testing	2	4	2	5
Other	4	3	5	9

RCUSAGE,RLEO